Vol. XII. — No. 8. August 1930.

BULLETIN

OF THE

INTERNATIONAL RAILWAY CONGRESS ASSOCIATION

(ENGLISH EDITION)

[385. (06.111]

XIth SESSION

MADRID : 5-15 MAY 1930

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SUMMARY

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LIST OF THE PAPERS PUBLISHED.

NUMBER of the question.	TITLE OF THE QUESTION.	DOCUMENTS.	YEAR, MONTH AND PAGE of the English *Bulletin*.	NUMBER of the separate issue.
I	The use of concrete and reinforced concrete on railways.	1st Report (Belgium, France, Italy, Portugal, Spain and their Colonies and Switzerland), by Messrs. Jullien and Claise.	October 1929, p. 1959.	28
		2nd Report (America, the British Empire, China and Japan), by Mr. F. B. Freeman.	May 1929, p. 433.	1
		3rd Report (other countries), by Mr. E. Krick.	December 1929, p. 2975.	45
II	Resistance of rails against breakage and to wear.	1st Report (America), by Mr. R. B. Abbott.	May 1929, p. 483.	2
		2nd Report (other countries, except the British Empire, China and Japan), by Messrs. Cambournac and Patte.	October 1929, p. 2011.	29
		3rd Report (the British Empire, China and Japan), by Dr. S. Matsunawa.	August 1929, p. 1157.	13
III	Investigation into the static and dynamic stresses in railway bridges.	1st Report (America), by Mr. P. G. Lang, Jr	May 1929, p. 502.	3
		2nd Report (the British Empire, China and Japan), by Sir Henry Fowler and Mr. G. Ellson.	July 1929, p. 859.	8
		3rd Report (Belgium, France and their Colonies), by Messrs. A. A. C. Ronsse and R. Desprets.	December 1929, p. 3103.	48
		4th Report (other countries), by Mr. A. Fava.	December 1929, p. 3129.	49
IV	Recent improvements in permanent way tools, and in the scientific organisation of maintenance work.	1st Report (Belgium, France, Italy, Portugal, Spain and their Colonies), by Mr. D. Mendizabal.	January 1930, p. 9.	61
		2nd Report (America, the British Empirie, China and Japan), by Mr. Ch. H. J. Driessen.	February 1930, p. 385.	58
		3rd Report (other countries, except Germany), by Mr. J. Hauer.	March 1930, p. 1029.	70
		4th Report (Germany), by Dr. Ing. Müller.	March 1930, p. 1079.	71
V	Locomotives of new types; in particular, turbine locomotives and internal combustion motor locomotives.	1st Report (Belgium, France, Italy, Portugal, Spain and their Colonies), by Mr. Cossart.	November 1929, p. 2397.	35

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V (*continued*)	Locomotives of new types; in particular, turbine locomotives and internal combustion motor locomotives.	2nd Report (British Empire, China and Japan), by Mr. R. E. L. Maunsell.	September 1929, p. 1563.	19
		3rd Report (other countries, except America), by Mr. P. Koller.	April 1930, p. 1259.	74
		4th Report (America), by Mr. A. Lipetz.	March 1930, p. 863.	67
		5th Report (Germany), by Prof. H. Nordmann.	January 1930, p. 259.	56
VI	Improvements in the steam locomotive.	1st Report (France, Italy, Portugal, Spain and their Colonies), by Mr. Parmantier.	September 1929, p. 1573.	20
		2nd Report (other countries, except America, the British Empire, China, Japan and Germany), by Mr. Th. Bals.	November 1929, p. 2421.	36
		3rd Report (America), by Mr. W. L. Lentz.	October 1929, p. 2113.	30
		4th Report (British Empire, China and Japan), by Mr. H. N. Gresley.	November 1929, p. 2689.	41
		5th Report (Germany), by Mr. R. P. Wagner.	January 1930, p. 99.	52
VII	Electric locomotives for main line traction.	1st Report (France and Colonies), by Messrs. de Boysson and Leboucher.	September 1929, p. 1733.	22
		2nd Report (America), by Mr. J. V. B. Duer.	July 1929, p. 887.	9
		3rd Report (British Empire, China and Japan), by Dr. K. Asakura and Dr. H. Imaidzumi.	September 1929, p. 1681.	21
		4th Report (other countries, except Germany), by Mr. G. Bianchi.	December 1929, p. 2997.	46
		5th Report (Germany), by Dr. Ing. W. Wechmann.	April 1930, p. 1309.	75
VIII	All-steel coaches. Comparison with vehicles built of wood.	1st Report (Belgium, France and their Colonies), by Messrs. Lancrenon and Vallancien.	July 1929, p. 1023.	10
		2nd Report (other countries, except America, the British Empire, China, Japan and Germany), by Messrs. M. Garcia-Varo and P. Fraile.	September 1929, p. 1771.	23
		3rd Report (America, British Empire, China and Japan), by Mr. E. J. H. Lemon.	June 1929, p. 589.	5
		4th Report (Germany), by Mr. E. Dähnick.	February 1930, p. 635.	63
IX	Relations between railways and sea ports.	1st Report (all countries, except those hereafter), by Messrs. E. Ehrenfreund and L. Belmonte.	July 1929, p. 1093.	11
		2nd Report (America, the British Empire, China and Japan), by Mr. C. M. Jenkin Jones.	October 1929, p. 2257.	31

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IX (*continued*).	Relations between railways and sea ports.	3rd Report (Belgium, France and their Colonies), by Mr. U. Lamalle.	February 1930, p. 535.	61
X	Methods to be used in marshalling yards to control the speed of vehicles being shunted, and to ensure they travel on to the lines in the various groups of sidings.	1st Report (all countries, except those hereafter), by Mr. C. Fiala.	August 1929, p. 1277	14
		2nd Report (America, the British Empire, China and Japan), by Mr. C. R. Byrom.	June 1929, p. 715.	6
		3rd Report (France, Italy, Portugal, Spain and their Colonies), by Messrs. Pellarin and Farenc.	December 1929, p. 3059.	47
		4th Report (Germany), by Dr. Ing. P. Gottschalk.	January 1930, p. 309.	57
XI	Signalling of lines for fast traffic and in main stations. Daylight signals. Automatic block system.	1st Report (America, the British Empire, China and Japan), by Mr. G. H. Dryden.	September 1929, p. 1805.	24
		2nd Report (other countries, except Belgium, France, Italy, Portugal, Spain and their Colonies), by Mr. J. Kristensen.	December 1929, p. 3155.	50
		3rd Report (Belgium, France and their Colonies), by Mr. G. C. A. Willaert.	February 1930, p. 723.	65
		4th Report (Italy, Portugal, Spain and their Colonies), by Messrs. A. Gibert and J. Nogues.	April 1930, p. 1161.	72
		5th Report (Germany), by Mr. W. Stäckel.	March 1930, p. 997.	69
XII	Economical traction methods for use in particular cases.	1st Report (the British Empire, China and Japan), by Mr. R. H. Nicholls.	September 1929, p. 1869.	25
		2nd Report (other countries, except those hereafter), by Mr. H. Hunziker.	December 1929, p. 2859.	42
		3rd Report (Belgium, France, Italy, Portugal, Spain and their Colonies), by Mr. O. A. Gaeremynck.	January 1930, p. 147.	53
		4th Report (Germany), by Mr. Leibbrand.	February 1930, p. 585.	62
		5th Report (America), by Messrs. H. B. Voorhees and Geo. H. Emerson.	March 1930, p. 771.	66
XIII	Competition of road transport.	1st Report (America, China and Japan), by Mr. C. B. Sudborough.	June 1929, p. 767.	7
		2nd Report (Belgium, France, Italy, Portugal, Spain and their Colonies), by Messrs. Le Besnerais and Dégardin.	November 1929, p. 2605.	39
		3rd Report (the British Empire), by Mr. H. L. Wilkinson.	August 1929, p. 1287.	15
		4th Report (other countries, except Germany), by Dr. A. Wasiutynsky.	December 1929, p. 2877.	43
		5th Report (Germany), by Dr. jur. H. Zietzschmann.	January 1930, p. 191.	54

NUMBER of the question.	TITLE OF THE QUESTION.	DOCUMENTS.	YEAR, MONTH AND PAGE of the English *Bulletin*.	NUMBER of the separate issue.
XIV	Use in railway work of machines for simplifying statistical and accountancy work.	1st Report (America, the British Empire, China and Japan), by Mr. W. E. Eppler.	May 1929, p. 507.	4
		2nd Report (other countries, except Germany), by Messrs. Bruneau and Boistel d'Welles.	November 1929, p. 2499.	37
		3rd Report (Germany), by Dr. Ing. K. Tecklenburg and Mr. Gaier.	March 1930, p. 951.	68
XV	Co-operation of the staff towards increased efficiency and its participating in the profits.	1st Report (America, the British Empire, China and Japan), by C. C. Cook.	July 1929, p. 1125.	12
		2nd Report (Belgium, France and their Colonies), by Messrs. Soulez and Bloch.	November 1929, p. 2533.	38
		3rd Report (other countries), by Messrs. R. Marin del Campo and J. Canovas del Castillo.	January 1930, p. 215.	55
XVI	Methods followed in training of staff, professional, technical and ordinary working grades.	1st Report (all countries, except those hereafter), by Mr. Mereutza.	August 1929, p. 1453.	17
		2nd Report (Belgium, France, Holland, Italy, Portugal, Spain and their Colonies), by Mr. Barth.	September 1929, p. 1905.	26
		3rd Report (America, the British Empire, China and Japan), by Mr. L. C. Fritch.	August 1929, p. 1315.	16
		4th Report (Germany), by Dr. Ing. B. Schwarze.	April 1930, p. 1197.	73
XVII	Penetration railways	1st Report (all countries, except those hereafter), by Mr. E. Mellini.	November 1929, p. 2657.	40
		2nd Report (America, the British Empire, China and Japan), by Sir Ashley Biggs and Mr. C. W. Lloyd Jones.	August 1929, p. 1487.	18
		3rd Report (Belgium, France, Holland, Portugal, Spain and their Colonies), by Mr. Pierre Jourdain.	December 1929, p. 2925.	44
XVIII	Improvements in the permanent way equipment of light railways.	1st Report (Europe), by Mr. Van Noorbeeck.	October 1929, p. 2149.	32
		2nd Report (other countries), by Mostapha Hamdy El Kattan Bey.	September 1929, p. 1941.	27
XIX	Electrification of secondary lines.	1st Report (Europe), by Mr. Sekutowicz.	February 1930, p. 491.	60
		2nd Report (other countries), by Messrs. D. E. Ribera and J. M. Garcia-Lomas.	February 1930, p. 665.	64
XX	Rail motor vehicles	1st Report (France), by Mr. Paul Beghin.	October 1929, p. 2203.	33
		2nd Report (all countries, except Europe), by Messrs. C. E. Brooks and R. G. Gage.	October 1929, p. 2229.	34
		3rd Report (Europe, except France), by Mr. Z. Zavadjil.	February 1930, p. 443.	59

PROGRAMME OF EVENTS

Monday 5 May.

At 10 a. m. — Meeting of the Executive Committee.

At 11 a. m. — Meeting of the Permanent Commission.

At 12.15 a. m. — Reception of delegates by the Permanent Commission, at the Senate House.

At 4 p. m. — Formal opening of the XIth Session at the Senate House, by H. M. King Alfonso XIII, Honorary President.

Election of the president and of the officers of the Session.

Tuesday, 6 May.

At 9 a. m. — Each section meets under the temporary presidency of one of the members of the Permanent Commission, to elect its officers.

At 9.30 a. m. — Sectional meetings.

At 10 a. m. — Excursion No. 1 : Motor trip through Madrid (Excursion arranged for the families of members by courtesy of the International Sleeping Car Company).

At 5 p. m. — Reception by the Municipality in the Retiro Park.

At 10 p. m. — Pelota vasca match (Basque ball game), at the Fronton Jai-Alai, calle de Alphonso XI.

Wednesday, 7 May.

At 9.30 a. m. — Sectional meetings.

Afternoon. — Alternative excursions :

Excursion No. 2. — Visit to the works of the Madrid-Saragossa-Alicante Railways at Villaverde. Refreshments at the invitation of the Company.

Excursion No. 3. — Visit to the works of the Madrid Tramway Company. Refreshments at the invitation of the Company.

Excursion No. 4. — Inauguration of Railwaymen's Orphanage, by H. M. King Alfonso XIII.

Thursday, 8 May.

At 9.30 a. m. — Sectional meetings.

At 10 p. m. — Concert at the Gran Metropolitano Theatre, offered by the Spanish Local Organising Committee.

Friday, 9 May.

At 9.30 a. m. — Sectional meetings.

At 10 a. m. — Excursion No. 5. — Motor trip through Madrid (Excursion arranged for the families of members by courtesy of the International Sleeping Car Company).

At *3.30 p. m.* — Sectional meetings.

At 9 p. m. — Official banquet at the Palace Hotel, Madrid, given by the Spanish Local Organising Committee.

Saturday, 10 May.

At 9.30 a. m. — General meeting.

At 10 a. m. — Excursion No. 6. — Motor trip through Madrid (Excursion arranged for the families of members by courtesy of the International Sleeping Car Company).

At 4 p. m. — Visit to the installations of the Metropolitan Underground Railway Company Alfonso XIII.

Sunday, 11 May.

Alternative excursions as under :

Excursion No. 7*a*. — Toledo. Departure from Madrid in the morning, by motor car. Visit to the town and its monuments and buildings. Return to Madrid at dusk. Lunch and afternoon refreshments at Toledo.

Excursion No. 7*b*. — Toledo. Departure from Madrid in the morning, by special train.

Visit to the town and its monuments and buildings. Return to Madrid at dusk. Lunch and afternoon refreshments at Toledo.

Excursion No. 8. — Salamanca. Departure from Madrid in the morning, by special train. Visit to the town and its monuments and buildings. Return to Madrid in the evening. Lunch and dinner on the train, afternoon refreshments at Salamanca.

Excursion No. 9. — Segovia-La Granja. Departure from Madrid in the morning, by motor car. Visit to the monuments and buildings of Segovia and the gardens of the Royal Palace at La Granja. Lunch at Segovia and afternoon refreshments at La Granja. Return to Madrid at dusk.

Excursion No 10*a*. — El Escorial. Departure from Madrid in the morning, by motor car. Visit to the Monastery, Palace and Royal Gardens. Return to Madrid in the afternoon. Lunch at El Escorial.

Escursion No. 10*b*. — El Escorial. Departure from Madrid in the morning, by special train. Visit to the Monastery, Palace and Royal Gardens. Return to Madrid in the afternoon. Lunch at El Escorial.

Excursion No. 10*c*. — El Escorial. Departure from Madrid at noon, by special train. Visit to the Monastery, Palace and Royal Gardens. Return to Madrid at dusk. Lunch on the train.

Excursion No. 11. — Avila. Departure from Madrid in the morning, by special train. Visit to the city and its monuments and buildings. Return to Madrid in the evening. Lunch and dinner on the train.

Excursion No. 12*a*. — Aranjuez. Departure from Madrid in the afternoon, by motor car. Visit to Gardens and Royal Palaces. Return to Madrid at dusk. Afternoon refreshments in Aranjuez.

Excursion No. 12*b*. — Aranjuez. Departure from Madrid in the afternoon, by special train. Visit to Gardens and Royal Palaces. Return to Madrid at dusk. Afternoon refreshments in Aranjuez.

Monday, 12 May.

At 9.30 a. m. — Sectional meetings.

At 10 a. m. — Excursion No. 13. — Motor trip through Madrid (Excursion arranged for the families of members by courtesy of the International Sleeping Car Company).

At 3.30 p. m. — Sectional meetings.

Tuesday, 13 May.

Alternative excursions as under :

Excursion No. 14*a*. — Toledo. Departure from Madrid in the morning, by motor car. Visit to the city and its buildings and monuments. Return to Madrid at dusk. Lunch and afternoon refreshments at Toledo.

Excursion No. 14*b*. — Toledo. Departure from Madrid in the morning, by special train. Visit to the city and its buildings and monuments. Return to Madrid at dusk. Lunch and afternoon refreshments at Toledo.

Excursion No. 15. — Salamanca. Departure from Madrid in the morning, by special train. Visit to the city and its buildings and monuments. Return to Madrid in the evening Lunch and dinner on the train. Afternoon refreshments at Salamanca.

Excursion No. 16. — Segovia-La Granja. Departure from Madrid in the morning, by motor car. Visit to the monuments and buildings of Segovia and the gardens of the Royal Palace at La Granja. Lunch at Segovia and afternoon refreshments at La Granja. Return to Madrid at dusk.

Excursion No. 17*a*. — El Escorial. Departure from Madrid in the morning, by motor car. Visit to the Monastery, Palace and Royal Gardens. Return to Madrid in the afternoon. Lunch at El Escorial.

Excursion No 17*b*. — El Escorial. Departure from Madrid in the morning, by special train. Visit to the Monastery, Palace and Royal Gardens. Return to Madrid in the afternoon. Lunch at El Escorial.

Excursion No. 17*c*. — El Escorial. Departure from Madrid at noon, by special train. Visit to the Monastery, Palace and Royal Gar-

dens. Return to Madrid at dusk. Lunch on the train.

Excursion No. 18. — Avila. Departure from Madrid in the morning, by special train. Visit to the city and its buildings and monuments. Return to Madrid in the evening. Lunch and dinner on the train.

Excursion No. 19*a*. — Aranjuez. Departure from Madrid in the afternoon, by motor car. Visit to the Gardens and Royal Palaces. Return to Madrid at dusk. Afternoon refreshments at Aranjuez.

Excursion No. 19*b*. — Aranjuez. Departure from Madrid in the afternoon, by motor car. Visit to the Gardens and Royal Palaces. Return to Madrid at dusk. Afternoon refreshments at Aranjuez.

Wednesday, 14 May.

At 9.30 a. m. — Sectional meetings.

At 10 a. m. — Excursion No. 6. — Motor trip through Madrid (by invitation of the International Sleeping Car Company to the families of members).

At 3.30 p. m. — General meeting.

At 10 p. m. — Reception given to delegates by H. M. the King in the Royal Palace.

Thursday, 15 May.

At 9.30 a. m. — General meeting.

At 12.30 a. m. — Closing meeting under the presidency of H. R. H. the Prince of the Asturias.

At 6 p. m. — Visit to the Spanish National Telephone Company's building and installations.

Friday, 16 May.

Excursion No. 21. — Motor-trip through Madrid (by invitation of the International Sleeping Car Company to members who do not join the excursions to Sevilla and Barcelona arranged for this date).

Alternative excursions :

Excursion No. 22. — Trip to Sevilla by special train. Departure from Madrid in the morning. Lunch on the train. Arrival at Cordova in the afternoon. Visit to the town, its monuments and buildings. Refreshments at the Regina Hotel. Arrival at Sevilla in the evening.

Excursion No. 23. — Trip to Barcelona by special train. Departure from Madrid in the morning, arrival at Barcelona in the evening. Lunch on the train.

Saturday, 17 May.

Alternative excursions :

Excursions Nos. 24*a* and 24*b*. — Trip to Sevilla by special train. Departure from Madrid in the morning. Lunch on the train. Arrival at Cordova in the afternoon. Visit to the town, its monuments and buildings. Refreshments at the Regina Hotel. Arrival at Sevilla in the evening.

Excursions Nos. 25*a* and 25*b*. — Trip to Barcelona by special train. Departure from Madrid in the morning. Arrival at Barcelona in the evening. Lunch on the train.

Programme of the stay at Sevilla.

Saturday, 17 May.

Trip to Xeres by special train (for delegates who arrived at Sevilla on the 16 May). Visit to the cellars of Messrs. Domecq and Gonzalez Byass. Lunch at Xeres. Visit to the stables of Messrs. Guerrero and Domecq. Return to Sevilla by special train.

Sunday, 18 May.

At 11 a. m. — Reception at the City Hall by the Mayor and Corporation. Afternoon: Bull fight.

Members who do not attend the bull fight can see a solemn religious procession in town in the afternoon.

Monday, 19 May.

At 5 p. m. — Organ concert in the Cathedral. — *At 10.30 p. m.*, « Verbena » (Andalusian fête) on the Plaza de America at the Ibero-American Exhibition.

Tuesday, 20 May.

« Derribo » (Andalusian fête in the Cortijo de Cuarto [bull farm]) of Messrs. de Miura.

Wednesday, 21 May.

Trip to Xeres by special train (for delegates who arrived at Sevilla on the 17 May); same programme as that of 17 May.

Excursion No. 26. — Return journey Sevilla-Madrid by special train (by day).

Programme of the stay at Barcelona.

Sunday, 18 May.

At 8.45 a. m. — Motor trip through Barcelona. Visit to the principal monuments and buildings.

At noon. — Reception, refreshments and toast of honour given by the Town Council of Barcelona at the Casa Consistorial.

Monday, 19 May.

At 8.45 a. m. — Trip to Montserrat by special train. Arrival at Montserrat at 10.42 a. m. (by mountain railway from Monistrol to Montserrat). Visit to the Monastery. Lunch offered by the Barcelona Provincial Council. Departure for Barcelona at 4.50 p. m. Arrival at 6.47 p. m.

Tuesday, 20 May.

At 9.30 a. m. — Motor trip and visit to the National Exhibition of Barcelona.

At 1 p. m. — Lunch in the Rosaleda (Exhibition) by invitation of the Spanish Local Organising Committee of the Madrid Congress.

At 4.30 p. m. — « Fête régionale » in the Plaza del Pueblo Español.

At 6 p. m. — Tea in the « Corporation Hall » of the Pueblo Español, by invitation of the Executive Committee of the National Exhibition of Barcelona.

GENERAL LIST OF DELEGATES

N. B. — A sign (•) means that a delegate is already a member of the Congress in some other capacity, this latter being inserted in brackets. Members so marked are not included in the number allowed to their Company.

✱ = Present at Madrid.

I. — Delegates of the Permanent Commission.

A. — Permanent Commission.

President :

✱ E. **Foulon,** Directeur général de la Société Nationale des chemins de fer belges (Belgium).

Vice-presidents :

✱ C. **Colson,** Membre de l'Institut, inspecteur général des ponts et chaussées, vice-président honoraire du Conseil d'Etat de France, membre du Conseil supérieur des chemins de fer (France) ;

✱ U. **Lamalle,** Directeur de l'Exploitation à la Société Nationale des chemins de fer belges (Belgium).

Ex-President of session, ex-officio member:

The Right Hon. Viscount **Churchill,** G. C. V. O., Chairman, Great Western Railway (Great Britain).

Members :

R. H. **Aishton,** President, American Railway Association (U. S. A.) ;

✱ T. A. **Alstrup,** Directeur général des chemins de fer de l'Etat (Denmark) ;

W. W. **Atterbury,** President, Pennsylvania Railroad Company (U. S. A.) ;

Sir Ernest Albert Seymour **Bell,** Kt., C. I. E., Member of the Boards of Directors, Bengal-Nagpur and South Indian Railway Companies ;

✱ F. **Besser,** Ministerialrat, Reichsverkehrsministerium (Germany) ;

F. **Castello,** Ingénieur, directeur général des chemins de fer au Ministère des travaux publics (Argentine Republic) ;

✱ J. **Castiau,** Directeur général au Ministère des traports (Belgium) ;

H. **Caufriez,** Directeur général de la Société Nationale des chemins de fer vicinaux (Belgium) ;

✱ The Right Hon. Sir Evelyn **Cecil,** G. B. E., Privy councillor, director, Southern Railway (Great Britain) ;

✱ **Dautry,** Directeur général des chemins de fer de l'Etat (France) ;

✱ Sir Francis **Dent,** C. V. O., Director, Southern Railway (Great Britain) ;

✱ B. **Djouritchitch,** Directeur général des chemins de fer (Kingdom of Jugoslavia) ;

✱ **Dorpmüller,** Generaldirektor der Deutschen Reichsbahn Gesellschaft (Germany) ;

✱ A. **Fabris,** Ingénieur, chef du service du matériel et de la traction des chemins de fer de l'Etat (Italy) ;

✱ F. **Fiori,** Ingénieur, Administrateur des chemins de fer de l'Etat (Italy) ;

✱ M. **Fontaneilles,** Inspecteur général des ponts et chaussées, président de la section des chemins de fer au Conseil général des ponts et chaussées de France, président du Conseil de réseau des Chemins de fer d'Alsace et de Lorraine (France) ;

✱ Sir Henry **Fowler,** K. B. E., Chief mechanical engineer, London Midland & Scottish Railway (Great Britain) ;

✱ A. **Frank,** Ingénieur des ponts et chaussées, directeur au Ministère des Communications (Poland) ;

✱ P. **Ghilain,** Ingénieur en chef au service du matériel de la Société Nationale des chemins de fer belges (Belgium) ;

Sir Guy **Granet,** G. B. E., Chairman, London Midland & Scottish Railway (Great Britain) ;

A. **Granholm,** Directeur général des chemins de fer de l'Etat (Sweden) ;

✱ **Grimpret,** Conseiller d'Etat, directeur général des chemins de fer au Ministère des travaux publics (France) ;

✱ R. J. **Harvey,** Consulting engineer to the Government of New Zealand ;

✱ **Henry-Gréard,** Directeur de la Compagnie du chemin de fer de Paris à Orléans (France) ;

T. **Hirayama,** Secretary of the Ministry of Railways of the Japanese Government and Manager of its Berlin Office ;

✱ H. **Hunziker,** Ingenieur, directeur de la division des chemins de fer du Département fédéral des postes et des chemins de fer (Switzerland) ;

✱ Sir Cyril **Hurcomb,** K. B. E., C. B., Secretary to the Ministry of Transport (Great Britain) ;

✱ A. **Jacques,** Directeur de la voie à la Société Nationale des chemins de fer belges (Belgium) ;

✱ P. E. **Javary,** Directeur de l'exploitation de la Compagnie du chemin de fer du Nord (France) ;

E. **Kejr,** Ingénieur, Conseiller des constructions du département V/1 au Ministère des chemins de fer (Czechoslovakia) ;

L. F. **Loree,** President, Delaware & Hudson Railroad (U. S. A) ;

Manen (H. van), Directeur des chemins de fer néerlandais (Netherlands) ;

✱ A. **Mange,** Président du Comité de gérance de l'Union Internationale des Chemins de fer ;

✱ C. **Marchi,** Député au parlement, président général de la Confederazione nazionale fascista dei trasporti terrestri e della navigazione interna (Italy) ;

M. **Margot,** Directeur général de la Compagnie des

hemins de fer de Paris à Lyon et à la Méditerranée (France) ;

✱ A. **Marguerat,** Ingénieur, directeur des Compagnies de hemins de fer Viége à Zermatt, Furka-Oberalp, Gornergrat et Schöllenen (Switzerland) ;

E. **Maristany,** Marquis d'Argentera, Directeur général de la Compagnie des chemins de fer de Madrid à Saragosse et à Alicante (Spain) ;

✱ C. **Mereutza,** Sous-Directeur général des Chemins de fer (Rumania) ;

G. **Molle,** Secrétaire technique à la direction générale de la Société Nationale des chemins de fer belges (Belgium) ;

C. **Oddone,** Directeur général des chemins de fer de l'Etat (Italy) ;

✱ J. R. **Paul,** Directeur de la Compagnie des chemins de fer du Midi (France) ;

✱ G. **Philippe,** Inspecteur général des lignes Nord-belges (Belgium) ;

P. **Riboud,** Directeur de la Compagnie des chemins de fer de l'Est (France) ;

N. **Rulot,** Directeur du matériel de la Société Nationale des chemins de fer belges (Belgium) ;

✱ A. **Schrafl,** Président de la Direction générale des Chemins de fer fédéraux (Switzerland) ;

Abdul-Hamid **Soliman** Pacha, Directeur général des chemins de fer de l'Etat (Egypt) ;

✱ Sir Josiah **Stamp,** G. B. E., D. Sc., Chairman of the Company and president of the Executive, London Midland & Scottish Railway (Great Britain) ;

✱ J. J. **Stieltjes,** Inspecteur général au service de la surveillance des chemins de fer des Pays-Bas (Netherlands) ;

Sir Henry W. **Thornton,** K. B. E., Chairman and president, Canadian National Railways ;

Tsang Ou, Directeur général adjoint du chemin de fer du Lunghai (China) ;

✱ Antonio **Valenciano y Mazerès,** Ingénieur en chef des ponts et chaussées, administrateur de la Compagnie des chemins de fer de Madrid à Saragosse et à Alicante (Spain) ;

✱ D. **Vickers,** Engineer, director, London Midland & Scottish Railway (Great Britain) ;

✱ J. S. de V. **von Willich,** B. Sc., Advisory engineer at the Office of the High Commissionner for the Union of South Africa ;

✱ Sir Ralph Lewis **Wedgwood,** C. B., C. M. G., Chief general manager, London & North Eastern Railway (Great Britain) ;

D. **Willard,** Chairman of the Board, American Railway Association ; president, Baltimore & Ohio Railroad ;

✱ **Wolf,** Geheimrat, Direktor der Deutschen Reichsbahn Gesellschaft und Mitglied des Direktionskomittees dieser Gesellschaft (Germany).

Honorary member :

G. **Behrens,** Director, London Midland & Scottish Railway.

General secretary :

✱ P. **Ghilain** ♦.

Secretary-treasurer :

✱ J. **Habran,** Directeur d'administration honoraire des chemins de fer de l'Etat belge.

Administrative councillor :

✱ A. **Braem,** Conseiller honoraire de la Société Nationale des chemins de fer belges.

Assistant secretaries :

✱ R. **Desprets,** ingénieur principal à la Société Nationale des chemins de fer belges ;

✱ E. **Minsart,** Ingénieur principal à la Société Nationale des chemins de fer belges ;

✱ A. W. **Chantrell,** Ingénieur principal à la Société Nationale des chemins de fer belges.

Chief of the Secretariat :

✱ V. **Teugels.**

Secretariat :

✱ E. **Nollet.**

B. — Temporary Members of the Permanent Commission (Executive Committee of the Spanish Local Organising Committee).

President :

✱ José **Gaytán de Ayala** ♦, Président du Conseil des travaux publics.

Members :

✱ Antonio **Faquineto,** Directeur général des chemins de fer et tramways ;

✱ Luis **Moralès,** Vice-Président du Conseil supérieur des chemins de fer, Président du Conseil d'administration de la Compagnie Nationale des chemins de fer de l'Ouest de l'Espagne ;

✱ Antonio **Valenciano y Mazerès** ♦, Ingénieur des ponts et chaussées, administrateur de la Compagnie des chemins de fer de Madrid à Saragosse et à Alicante (member of the Permanent Commission) ;

✱ Juan **Barceló,** Membre du Conseil supérieur des chemins de fer ;

✱ Félix **Boix,** Administrateur-Directeur de la Compagnie des chemins de fer du Nord de l'Espagne ;

✱ Alfredo **Baüer,** Président du Conseil d'administration de la Compagnie des chemins de fer de Madrid à Saragosse et à Alicante ;

✱ Joaquin **Arteaga,** duc del Infantado, Président du Conseil d'administration de la Compagnie des chemins de fer Andalous ;

✱ Estanislao **Urquijo,** marquis d'Urquijo, Vice-Président du Conseil d'administration de la Compagnie des chemins de fer du Nord de l'Espagne ;

✱ José **Moreno,** comte de Fontao, Directeur-Adjoint de la Compagnie des chemins de fer du Nord de l'Espagne ;

✱ Manuel Maria **Arrillaga,** Sous-Directeur de la Compagnie des chemins de fer de Madrid à Saragosse et à Alicante.

Secretaries :

✱ Augusto **Krahe,** Ingénieur en chef à la Compagnie Nationale des chemins de fer de l'Ouest de l'Espagne ;

✱ José Maria **Garcia-Lomas,** Ingénieur attaché à la Direction de la Compagnie des chemins de fer du Nord de l'Espagne.

C. — Spanish Local Organising Committee.

President :

✱ José **Gaytán de Ayala,** Président du Conseil des travaux publics.

Honorary vice-presidents :

✱ Don Pedro **Matos**, Ministre du Fomento ;

✱ M. le comte de **Guadalhorce**, ancien Ministre du Fomento.

Vice-presidents :

✱ Eduardo **Maristany** ♦, marquis d'Argentera, directeur général de la Compagnie des chemins de fer de Madrid à Saragosse et à Alicante (member of the Permanent Commission) ;

✱ Félix **Boix** ♦, administrateur-directeur de la Compagnie des chemins de fer du Nord de l'Espagne.

Members :

✱ Antonio **Mayandia**, président du Conseil supérieur des chemins de fer ;

✱ Antonio **Faquineto** ♦, directeur général des chemins de fer et tramways ;

✱ Luis **Moralès** ♦, vice-président du Conseil supérieur des chemins de fer, président du Conseil d'administration de la Compagnie Nationale des chemins de fer de l'Ouest de l'Espagne ;

José N. **Salas**, ingénieur, chef de la 2e division technique et administrative des chemins de fer ;

✱ Antonio Hernández **Bayarri**, chef de la 2e division d'études et de construction des chemins de fer ;

✱ Le marquis de **Benicarló**, membre du Conseil supérieur des chemins de fer ;

✱ Juan **Barceló** ♦, membre du Conseil supérieur des chemins de fer ;

✱ José Antonio de **Artigas**, membre du Conseil supérieur des chemins de fer ;

✱ José Maria **González**, membre du Conseil supérieur des chemins de fer :

José L. **Mier y Mihura**, ingénieur, chef à la direction genérale des chemins de fer et tramways ;

✱ Miguel **del Campo**, président du Conseil forestier ;

✱ Antonio **Valenciano y Mazerès** ♦, ingénieur des ponts et chaussées, administrateur de la Compagnie des chemins de fer de Madrid à Saragosse et à Alicante (member of the Permanent Commission) ;

✱ Alfredo **Baüer** ♦, président du Conseil d'administration de la Compagnie des chemins de fer de Madrid à Saragosse et à Alicante ;

✱ Vicente Alonso **Martinez**, marquis d'Alonso Martinez, président du Conseil d'administration de la Compagnie des chemins de fer du Nord de l'Espagne ;

✱ Estanislao **Urquijo** ♦, marquis d'Urquijo, vice-président du Conseil d'administration de la Compagnie des chemins de fer du Nord de l'Espagne,

José Joaquin **Ampuero**, administrateur de la Compagnie des chemins de fer du Nord de l'Espagne ;

✱ Enrique de **Satrústegui**, baron de Satrústegui, administrateur de la Compagnie des chemins de fer du Nord de l'Espagne ;

José Gomez **Acebo**, marquis de Cortina, administrateur de la Compagnie internationale des Wagons-Lits et des Grands Express Européens ;

✱ José **Sainz**, vice-président du Conseil d'administration de la Compagnie des chemins de fer de Madrid à Saragosse et à Alicante ;

✱ Luis **Olanda**, directeur-adjoint de la Compagnie des chemins de fer du Nord de l'Espagne ;

✱ José **Moreno** ♦, comte de Fontao, directeur-adjoint de la Compagnie des chemins de fer du Nord de l'Espagne ;

✱ Carlos **Maristany**, administrateur-délégué du Comité de Barcelone de la Compagnie des chemins de fer de Madrid à Saragosse et à Alicante ;

✱ Manuel Maria **Arrillaga** ♦, sous-directeur de la Compagnie des chemins de fer de Madrid à Saragosse et à Alicante ;

✱ Joaquin **Arteaga** ♦, duc del Infantado, président du Conseil d'administration de la Compagnie des chemins de fer Andalous ;

✱ Mariano de **Foronda**, marquis de Foronda, administrateur de la Compagnie des chemins de fer Andalous.

✱ Manuel **Gimenez Lombardo**, directeur de la Compagnie des chemins de fer Andalous ;

Le comte de **Güell**, marquis de Comillas, président du Conseil du tourisme ;

✱ Luis de **Cepeda**, directeur-adjoint de la Compagnie Nationale des chemins de fer de l'Ouest de l'Espagne ;

✱ Antonio **Massó**, administrateur de la Compagnie Nationale des chemins de fer de l'Ouest de l'Espagne ;

✱ George L. **Boag**, directeur général de la Compagnie concessionnaire des chemins de fer de Lorca à Baza et de Deputácion de Almendricos au port de Aguilas (Great Southern of Spain Railway Company Limited) ;

✱ Valentin **Ruiz Senen**, président du Conseil d'administration de la Société des chemins de fer de Valence et Aragon ;

✱ Manuel **Alonso Zabala**, administrateur de la Compagnie des chemins de fer et tramways ;

✱ Nicolás de **Escoriaza**, vicomte d'Escoriaza, administrateur de la Compagnie du chemin de fer Central de Aragon ;

✱ Miguel **Otamendi**, directeur général de la Compagnie du Métropolitain Alfonso XIII ;

Gaston **Claude**, inspecteur principal de la division hispano-portugaise de la Compagnie internationale des Wagons-Lits et des Grands Express Européens.

✱ D. J. Martinez **Acacio**, directeur des travaux publics ;

Secretaries :

✱ Enrique **Delatte**, sous-directeur de la Compagnie des chemins de fer Madrid à Saragosse et à Alicante ;

Antonio **Velao**, vice-secrétaire du Conseil supérieur des chemins de fer ;

✱ Augusto **Krahe** ♦, ingénieur en chef de la Compagnie Nationale des chemins de fer de l'Ouest de l'Espagne,

✱ José Maria **Garcia-Lomas** ♦, ingénieur, attaché à la direction de la Compagnie des chemins de fer du Nord de l'Espagne.

Executive Committee.

President :

✱ José **Gaytàn de Ayala** ♦.

Members :

✱ Antonio **Faquineto** ♦ ;
✱ Luis **Moralès** ♦ ;
✱ Antonio **Valenciano y Mazerès** ♦ ;
✱ Juan **Barceló** ♦ ;
✱ Félix **Boix** ♦ ;
✱ Alfredo **Baüer** ♦ ;
✱ Joaquin **Arteaga**, duc del Infantado ♦ ;
✱ Estanislao **Urquijo**, marquis d'Urquijo ♦ ;
✱ Manuel Maria **Arrillaga** ♦.

Secretariat Committee.

Luis **Moralès** ♦;
Juan **Barceló** ♦;
✱ José **Moreno** ♦, comte de Fontao;
✱ Manuel Maria **Arrillaga** ♦.

Secretaries of the two Committees.

Augusto **Krahe** ♦;
✱ José Maria **Garcia-Lomas** ♦.

Assistants to the Secretariat of the Local Organising Committee.

Enrique **Alcaraz,** chef d'agence de la Compagnie des Wagons-Lits à Madrid;
José **Barcala,** délégué du Comité des travaux publics;
F. C. **Bas,** sous-secrétaire des finances;
Manuel **Becerra,** sous-directeur des travaux publics;
D. Ricardo **Bognerin,** président du Conseil des travaux publics:
F. **Canthal,** secrétaire d'ambassade;
A. **Cavestany**;
A. **Cerolaza,** bureau des statistiques au Conseil supérieur des chemins de fer;
J. L. **Chicheri**;
E. **Escoriaza**;
A. **Gonzalez,** inspecteur principal à la Compagnie internationale des Wagons-Lits;
J. **Gonzâlez Valerio**;
J. E. **Marrero,** architecte;
F. **Moreno,** ingénieur adjoint au Ministère du Fomento;
V. **de Nó,** ingénieur en chef du mouvement de la Compagnie Nationale du chemin de fer de l'Ouest de l'Espagne;
M. **Peyroncely,** adjoint au secrétaire de la Compagnie des chemins de fer de Madrid-Saragosse-Alicante;
R. J. **Rodriguez**;
F. Garcia de los **Rios,** secrétaire de la délégation des Compagnies au Conseil supérieur des chemins de fer;
P. **Seijas**;
N. **Suarez**;
J. **Urgoïti**;
F. **Wais,** ingénieur de l'exploitation des chemins de fer du Nord de l'Espagne.

D. — Reporters on the questions submitted to the Congress.

R. B. **Abbott,** assistant general superintendent, Reading Company (U. S. A.);

Dr. K. **Asakura,** chief of machinery and rolling stock section, Japanese Government Railways, Bureau of Mechanical Engineering;

✱ Th. **Bals,** inspecteur général des chemins de fer de l'Etat (Rumania);

✱ **Barth,** ingénieur principal attaché à la direction de la Compagnie des chemins de fer de l'Est (France);

✱ P. **Beghin,** directeur de la Compagnie des chemins de fer départementaux (France);

✱ L. **Belmonte,** ingénieur, inspecteur en chef supérieur au service de l'exploitation des chemins de fer de l'Etat (Italy);

✱ G. **Bianchi,** ingénieur, inspecteur en chef au service du matériel et de la traction des chemins de fer de l'Etat (Italy);

✱ Sir Ashley **Biggs,** late agent, Madras and Southern Mahratta Railways (India);

✱ **Bloch,** ingénieur en chef du service du matériel et des ateliers de la Compagnie du chemin de fer de Paris à Orléans (France);

de Boysson, ingénieur en chef du matériel et de la traction de la Compagnie du chemin de fer de Paris à Orléans (France);

C. E. **Brooks,** chief of motive power, Canadian National Railways;

✱ **Bruneau,** ingénieur en chef, adjoint au chef de l'exploitation de la Compagnie du chemin de fer de Paris à Orléans (France);

✱ C. R. **Byrom,** chief general superintendent, London Midland & Scottish Railway (Great Britain);

✱ **Cambournac,** ingénieur des ponts et chaussées, ingénieur en chef adjoint des travaux et de la surveillance de la Compagnie du chemin de fer du Nord (France);

✱ **Cánovas del Castillo,** ingénieur principal de la Direction de la Compagnie des chemins de fer de Madrid à Saragosse et à Alicante (Spain);

Claise, directeur du contrôle des travaux des lignes nouvelles et de la voie et des bâtiments au Ministère des travaux publics (France);

C. C. **Cook,** maintenance engineer, Baltimore and Ohio Railroad (U. S. A.);

✱ L. **Cossart,** ingénieur en chef des ateliers de machines à la Compagnie du chemin de fer du Nord (France);

✱ E. **Dähnick,** Reichsbahnoberrat, Deutsche Reichsbahn Gesellschaft (Germany);

✱ **Dégardin,** ingénieur principal au service central de l'exploitation de la Compagnie du chemin de fer de Paris à Orléans (France);

✱ R. **Desprets** ♦, ingénieur principal au service de la voie de la Société Nationale des chemins de fer belges (Belgium);

✱ Ch. H. J. **Driessen,** chef de division des chemins de fer néerlandais (Netherlands);

G. H. **Dryden,** signal engineer, Baltimore & Ohio Railroad (U. S. A.);

J. V. B. **Duer,** electrical engineer, Pennsylvania Railroad Company (U. S. A.);

✱ Boistel **d'Welles,** ingénieur en chef du Service central de l'exploitation de la Compagnie du chemin de fer de Paris à Orléans (France);

E. **Ehrenfreund,** ingénieur, chef d'arrondissement des chemins de fer de l'Etat (Italy);

G. **Ellson,** engineer, Southern Railway (Great Britain);

G. H. **Emerson,** chief of motive power and equipment, Baltimore and Ohio Railroad (U. S. A.);

✱ **Farenc,** sous-chef de l'exploitation de la Compagnie des chemins de fer du Midi (France);

✱ A. **Fava,** ingénieur, inspecteur en chef supérieur au service de la voie des chemins de fer de l'Etat (Italy);

✱ C. **Fiala,** ingénieur, conseiller principal au département VI/1 du Ministère des chemins de fer (Czechoslovakia);

✱ Sir Henry **Fowler** ♦, K. B. E., chief mechanical engineer, London Midland & Scottish Railway (member of the Permanent Commission);

✱ P. **Fraile,** sous-chef du service du matériel roulant de la Compagnie des chemins de fer du Nord de l'Espagne (Spain);

F. B. **Freeman,** chief engineer, New York Central Railroad (U. S. A.);

L. C. **Fritch,** vice-président, Chicago, Rock Island & Pacific Railway (U. S. A.).

✱ O. A. **Gaeremynck,** ingénieur principal au service de l'exploitation de la Société Nationale des chemins de fer belges (Belgium);

✱ R. G. **Gage,** chief electrical engineer, Canadian National Railways;

✱ Th. **Gaier,** Direktor bei der Reichsbahn, Deutsche Reichsbahn Gesellschaft (Germany);

✱ J. M. **Garcia-Lomas** ♦, ingénieur attaché à la direction des chemins de fer du Nord de l'Espagne (Spain);

✱ M. **Garcia-Varo,** ingénieur à la Compagnie des chemins de fer Andalous (Spain);

✱ A. **Gibert,** ingénieur en chef des services électriques de la Compagnie des chemins de fer de Madrid à Saragosse et à Alicante (Spain);

✱ Dr. Ing. P. **Gottschalk,** Reichsbahnrat, Deutsche Reichsbahn Gesellschaft (Germany);

✱ H. N. **Gresley,** chief mechanical engineer, London & North Eastern Railway (Great Britain);

J. **Hauer,** ingénieur, conseiller ministériel et chef du département IV/3 au Ministère des chemins de fer (Czechoslovakia);

✱ H. **Hunziker** ♦, directeur de la division des chemins de fer au Département fédéral des postes et des chemins de fer (member of the Permanent Commission) (Switzerland);

Dr. H. **Imaidzumi,** chief engineer of machinery and rolling stock section, Japanese Government Railways;

C. M. **Jenkin Jones,** superintendent, North Eastern Area, London & North Eastern Railway (Great Britain);

✱ P. **Jourdain,** administrateur-directeur des chemins de fer secondaires du Nord-Est (France);

✱ **Jullien,** ingénieur en chef de la voie et des travaux de la Compagnie du chemin de fer de Paris à Orléans (France);

Mostafa Hamdy El **Kattan** Bey, ingénieur en chef de la voie et des travaux des chemins de fer de l'Etat (Egypt);

✱ P. **Koller,** ingénieur, conseiller ministériel, sous-directeur des chemins de fer de l'Etat (Czechoslovakia);

✱ E. **Krick,** ingénieur, inspecteur de la direction générale des chemins de fer de l'Etat (Jugoslavia);

✱ J. **Kristensen,** ingénieur principal au service des signaux des chemins de fer de l'Etat (Denmark);

✱ U. **Lamalle** ♦, directeur de l'exploitation de la Société Nationale des chemins de fer belges (Belgium) (vice-president of the Permanent Commission);

✱ Lancrenon, ingénieur en chef adjoint du matériel et de la traction de la Compagnie du chemin de fer du Nord (France);

P. G. **Lang,** Jr., engineer of bridges, Baltimore and Ohio Railroad (U. S. A.);

✱ **Le Besnerais,** chef-adjoint de l'exploitation de la Compagnie du chemin de fer du Nord (France);

✱ **Leboucher,** ingénieur en chef des services techniques du matériel et de la traction de la Compagnie des chemins de fer du Midi (France);

✱ M. **Leibbrand,** Reichsbahndirektor, Deutsche Reichsbahn Gesellschaft (Germany);

✱ E. J. H. **Lemon,** carriage and wagon superintendent, London Midland & Scottish Railway (Great Britain);

✱ W. L. **Lentz,** engineer, motive power, New York Central Railroad (U. S. A.);

A. **Lipetz,** consulting engineer, American Locomotive Company (U. S. A.),

✱ C. W. **Lloyd Jones,** C. I. E., agent, His Exalted Highness the Nizam's Guaranteed State Railway (India);

✱ R. **Marin del Campo,** ingenieur du Conseil d'administration de la Compagnie des chemins de fer de Madrid à Saragosse et à Alicante (Spain);

✱ Dr. S. **Matsunawa,** doctor of engineering, director of the Research Office of the Japanese Government Railways;

R. E. L. **Maunsell,** C. B. E., chief mechanical engineer, Southern Railway (Great Britain);

✱ E. **Mellini,** ingénieur, inspecteur supérieur à l'inspection générale des chemins de fer, tramways et automobiles (Italy);

✱ D. **Mendizabal,** ingénieur en chef adjoint des voies et travaux à la Compagnie des chemins de fer de Madrid à Saragosse et à Alicante (Spain);

✱ C. **Mereutza** ♦, sous-directeur général des chemins de fer roumains (Rumania);

✱ Dr. Ing. O. **Müller,** Reichsbahndirektor, Deutsche Reichsbahn Gesellschaft (Germany);

✱ R. H. **Nicholls,** superintendent of the line, Great Western Railway (Great Britain);

✱ J. **Noguès,** ingénieur en chef adjoint du mouvement de la Compagnie des chemins de fer de Madrid à Saragosse et à Alicante (Spain);

✱ H. **Nordmann,** Professor, Reichsbahnoberrat, Deutsche Reichsbahn Gesellschaft (Germany);

✱ **Parmantier,** ingénieur en chef adjoint du matériel et de la traction de la Compagnie des chemins de fer de Paris à Lyon et à la Méditerranée (France);

✱ G. **Patte,** ingénieur en chef attaché au service central de la traction de la Compagnie des chemins de fer de l'Est (France);

✱ **Pellarin,** ingénieur en chef, adjoint à l'ingénieur en chef de l'exploitation de la Compagnie des chemins de fer de l'Est (France);

✱ J. E. **Ribera,** ingénieur, directeur général du chemin de fer de Tanger à Fez (Morocco);

✱ A. A. C. **Ronsse,** ingénieur en chef au service de la voie de la Société Nationale des chemins de fer belges (Belgium);

✱ Dr. Ing. B. **Schwarze,** Geheimer Baurat, Direktor der Deutschen Reichsbahn Gesellschaft (Germany);

Sekutowicz, directeur des services techniques de l'Omnium Lyonnais (France);

✱ **Soulez,** ingénieur en chef attaché à la direction de l'exploitation de la Compagnie du chemin de fer du Nord (France);

✱ W. **Stäckel,** Reichsbahndirektor, Deutsche Reichsbahn Gesellschaft (Germany);

C. B. **Sudborough,** assistant vice-president in charge of traffic, Pennsylvania Railroad (U. S. A.);

✱ **Tecklenburg,** Reichsbahndirektor, Deutsche Reichsbahn Gesellschaft (Germany);

✱ **Vallancien,** ingénieur principal à l'Office central d'études de matériel de chemins de fer (France);

✱ **Van Noorbeeck,** directeur des voies et travaux à la Société Nationale des chemins de fer vicinaux (Belgium);

✱ H. B. **Voorhees,** vice-president, Baltimore and Ohio Railroad (U. S. A.);

✱ P. **Wagner,** Reichsbahnoberrat, Deutsche Reichsbahn Gesellschaft (Germany) ;

✱ A. **Wasiutyński,** ingénieur des voies de communication, président de la Commission pour la reconstruction des gares terminales de Varsovie (Poland) ;

✱ Dr. Ing. W. **Wechmann,** Reichsbahndirektor, Deutsche Reichsbahn Gesellschaft (Germany) ;

✱ H. L. **Wilkinson,** assistant superintendent of the line, Great Western Railway (Great Britain) ;

✱ **Willaert,** ingénieur principal au service de la voie à la Société Nationale des chemins de fer belges (Belgium) ;

✱ W. C. **Wishart,** comptroller, New York Central Lines (U. S. A.) ;

✱ Z. **Zavadjil,** chef de la division des machines de la direction générale des chemins de fer de l'Etat (Jugoslavia) ;

✱ Dr. jur. H. **Zietzschmann,** Reichsbahndirektor, Deutsche Reichsbahn Gesellschaft (Germany).

E. — Principal Secretaries.

✱ **Allard,** directeur de la traction et du matériel à la Société Nationale des chemins de fer vicinaux (Belgium) ;

✱ A. W. **Chantrell** ♦ ;

R. **Desprets** ♦ ;

✱ E. **Hennig,** ingénieur à la Société Nationale des chemins de fer belges (Belgium) ;

✱ E. **Minsart** ♦ ;

✱ J. P. **Van Ryn,** ingénieur principal à la Société Nationale des chemins de fer belges (Belgium) ;

F. — Section Secretaries.

✱ P. **Arellano,** ingénieur des ponts et chaussées (Spain) ;

✱ D. W. **Ashworth,** London Midland and Scottish Railway (Great Britain) ;

✱ Prof. H. **Baumann,** Direktor bei der Deutschen Reichsbahn Gesellschaft (Germany) ;

✱ **Bourrel,** inspecteur à la Société des transports en commun de la région parisienne (France) ;

✱ **Chaperon,** chef adjoint des services administratifs à la Compagnie des chemins de fer du Nord (France) ;

✱ **Corner,** London & North Eastern Railway (Great Britain) ;

✱ **J. Eulate,** ingénieur du service de la traction de la Compagnie des chemins de fer du Nord de l'Espagne (Spain) ;

✱ King **Stephens,** Southern Railway (Great Britain) ;

✱ M. **Leibbrand** ♦, Reichsbahndirektor, Deutsche Reichsbahn Gesellschaft (reporter) (Germany) ;

✱ W. **Mac Lellan,** ingénieur des ponts et chaussées (Spain) ;

✱ G. **Morales** Lahuerta, ingénieur des études et constructions des chemins de fer (Spain) ;

✱ A. **Moreno,** ingénieur du service de l'exploitation de la Compagnie des chemins de fer du Nord de l'Espagne (Spain) ;

✱ J. **Planas,** ingénieur attaché à la direction générale de la Compagnie des chemins de fer de Madrid à Saragosse et à Alicante (Spain) ;

✱ K. **Pokorny,** Direktor bei der Deutschen Reichsbahn Gesellschaft (Germany) ;

✱ J. **Puig,** ingénieur du service du mouvement du réseau catalan de la Compagnie des chemins de fer de Madrid à Saragosse et à Alicante (Spain) ;

✱ G. **Reder,** ingénieur à Madrid ;

✱ F. **Reparaz,** ingénieur attaché à la direction de la Compagnie des chemins de fer du Nord de l'Espagne (Spain) ;

✱ **Rousseau,** inspecteur divisionnaire à la direction de la Compagnie du chemin de fer de Paris à Orléans (France) ;

✱ J. **Sainsbury,** general manager's office, Great Western Railway (Great Britain) ;

✱ **Santini,** ingénieur au service des approvisionnements à la Compagnie des chemins de fer de Paris à Lyon et à la Méditerranée (France) ;

✱ R. **Schutz,** ingénieur principal au service des études techniques du réseau d'Alsace et de Lorraine (France) ;

✱ J. **Tapia,** ingénieur des arts et manufactures du service de la traction de la Compagnie des chemins de fer du Nord de l'Espagne (Spain) ;

✱ **Thrupp,** London & North Eastern Railway (Great Britain) ;

✱ P. **Wagner,** Reichsbahnoberrat, Deutsche Reichsbahn Gesellschaft (reporter) (Germany) ;

✱ Dr. jur. **Zietzschmann** ♦, Reichsbahndirektor, Deutsche Reichbahn Gesellschaft (reporter) (Germany) ;

✱ Dr. A. **Velleman.**

II. — Members appointed by adherent Governments and Organisations and by affiliated Railway Administrations.

A. — Governments and their Delegates.

Allemagne (Germany).

Reichsverkehrsministerium :

✱ F. **Besser** ♦, Ministerialrat (member of the Permanent Commission) ;

✱ Dr. G. **Hein,** Ministerialrat ;

H. Niemack, Ministerialrat.

Argentine.

Ministère des travaux publics.

Belgique et Colonie (Belgium and Colony).

A. — BELGIUM.

Ministère des transports :

✱ **J. Castiau** ♦, directeur général (member of the Permanent Commission) ;

✱ H. **De Droog**, ingénieur en chef à la Société Nationale des chemins de fer belges, chef du cabinet du Ministre des transports.

B. — COLONY.

Ministère des colonies :

✱ L. **Van Leeuw**, directeur général du service des travaux publics et voies de communication.

Bolivie (Bolivia).

Ministère des travaux publics.

Brésil (Brazil).

Ministère de l'industrie, des communications et des travaux publics :

✱ C. A. **Moniz Gordilho**, chargé d'affaires à Madrid.

Bulgarie (Bulgaria).

Ministère des chemins de fer, postes et télégraphes :

✱ J. **Dantschoff**, directeur des constructions près la direction générale des chemins de fer et des ports bulgares.

Chili (Chile).

Ministère des voies et communications :

✱ C. **Guzman**, Donoso, professeur de topographie à l'Université du Chili ;

✱ V. D. **Silva**, consul du Chili, à Madrid.

Chine (China).

Ministère des chemins de fer :

✱ Sheng-Z. **Wang**, member of the Ministry of railways of the National Government of the Republic of China ;

✱ K. Y. **Woo**, representative of the Chinese Government Railway Administration ; director of European Bureau of the Ministry of railways of the National Government of the Republic of China.

Danemark (Denmark).

Ministère des travaux publics :

✱ T. A. **Alstrup** ♦, directeur général des chemins de fer de l'Etat (member of the Permanent Commission) ;

✱ C. V. **Jensen**, directeur du contrôle des chemins de fer privés ;

✱ Ch. **Buchwald**, chef de section au Ministère des travaux publics.

Dominicaine (République) (Dominican Republic).

Ministère des travaux publics.

Egypte (Egypt).

Ministère des communications :

✱ Mostafa Hamdi **El Kattan** Bey ♦, ingénieur en chef des chemins de fer de l'Etat (reporter) ;

✱ Youssef **Risgalbah** Bey, sous-directeur général des chemins de fer de l'Etat ;

✱ Abdel Rahman **Hamada** Effendi, chef divisionnaire de la traction des chemins de fer de l'Etat.

Equateur (République de l') (Ecuador Republic).

Ministère des travaux publics.

Espagne (Spain).

Ministère du Fomento :

B. **Calvet**, conseiller des travaux publics ;

✱ A. **Gomez Diaz**, conseiller des travaux publics ;

✱ G. **Rebollo y Canales**, membre du Conseil supérieur des chemins de fer ;

✱ V. **Valcárcel y de Mesa**, secrétaire général du Conseil supérieur des chemins de fer ;

✱ F. **Iribarren**, ingénieur en chef attaché au Conseil supérieur des chemins de fer ;

✱ V. **Machimbarrena**, inspecteur général, directeur de l'Ecole spéciale des ponts et chaussées ;

✱ J. **de Granda y Callejo**, ingénieur en chef de 2e classe, professeur à l'Ecole spéciale des ponts et chaussées ;

✱ S. **Benjumea y Burin**, chef de la 1re division des chemins de fer ;

✱ M. Garcia Briz, comte **de Baynoa**, ingénieur en chef de la 3e division des chemins de fer ;

✱ T. **Brioso Raggio**, ingénieur, attaché à la 4e division des chemins de fer ;

✱ T. **Lacasa y Navarro**, chef de la 1re division d'études et constructions de chemins de fer ;

✱ M. **Serret y Mirete**, chef de la 5e division d'études et constructions de chemins de fer ;

✱ F. **Castellón y Ortega**, chef de la 6e division d'études et constructions de chemins de fer ;

✱ F. **Prados Ruiz**, chef de la section de constructions de chemins de fer au Ministère du fomento ;

✱ D. **Mayoral**, ingénieur en chef, président du Comité technique pour l'électrification des chemins de fer ;

✱ A. **Nuñez Arenas**, chef d'administration de 2e classe et de la 4e section (trafic des chemins de fer) du Ministère du Fomento ;

✱ P. **Matos**, ingénieur attaché au Ministère du Fomento.

Etats-Unis d'Amérique (United States of America).

Office of Secretary of State :

✱ A. **Simmons**, colonel, U. S. A. Res. ;

✱ B. **Strong**, president of the Ramapo Ajax Corporation ;

✱ W. F. **Schleiter**, president of the Verona Tool Works ;

✱ C. H. **Muchnic**, consulting engineer ;

✱ Bird **Robinson**, president of the American Short Line Railroad Association ;

✱ G. R. **Carr**, chairman of the Board of the Locomotive Firebox Company, Chicago ;

✱ A. S. **Merz**, vice president, Standard Railway Equipment Company ;

✱ W. J. **Plogsted**, foreign representation, General Railway Signal Company ;

✱ F. A. **Poor**, president of the P. & M. Company ;

✱ H. A. **Smith**, president, Transportation Publishing Company, Inc.

Finlande (Finland).

Ministère des communications et des travaux publics :

✱ W. V. **Airas**, directeur du service de la traction aux chemins de fer de l'Etat.

France, Protectorats et Colonies (France, Protectorates and Colonies).

A. — FRANCE.

Ministère des travaux publics :

✱ C. **Colson** ♦, membre de l'Institut, inspecteur général des ponts et chaussées, vice-président honoraire du Conseil d'Etat, membre du Conseil supérieur des chemins de fer de France (vice-president of the Permanent Commission) ;

✱ **Grimpret** ♦, conseiller d'Etat, directeur général des chemins de fer au Ministère des travaux publics (member of the Permanent Commission) ;

✱ **Prot**, adjoint au directeur du contrôle de la voie et des bâtiments (reporter) ;

✱ **Moreau-Néret**, secrétaire général du Conseil supérieur des chemins de fer ;

✱ Th. **Tissier**, président du Comité consultatif des chemins de fer, vice-président du Conseil d'Etat ;

✱ **de Ruffi de Pontevès**, directeur du contrôle du travail des agents de chemins de fer ;

✱ **Gilles-Cardin**, directeur du contrôle de l'exploitation ;

✱ **Collin**, directeur du contrôle de l'exploitation technique ;

✱ **Benoist**, sous-directeur des chemins de fer ;

✱ **Lang**, ingénieur des ponts et chaussées, rapporteur près le Conseil supérieur des chemins de fer ;

✱ **Janet**, ingénieur des ponts et chaussées, adjoint au directeur général des chemins de fer ;

✱ **Jacquet**, inspecteur de l'exploitation du réseau d'Orléans, membre du Conseil supérieur des chemins de fer ;

✱ **Poirel**, employé principal aux ateliers des chemins de fer de l'Est, membre du Comité consultatif des chemins de fer.

B. — PROTECTORATES AND COLONIES.

Tunis.

Direction générale des travaux publics :

Mourgnot, directeur général des travaux publics ;

✱ **Buovolo**, directeur du contrôle des chemins de fer à la direction générale des travaux publics.

Grande-Bretagne, Inde, Dominions, Protectorats et Colonies. (Great Britain, India, Dominions, Protectorates and Colonies).

A. — GREAT BRITAIN.

Ministry of transport :

H. **Morrison**, M. P., Minister of transport ;

G. R. **Strauss**, M. P., parliamentary private secretary to the Minister of transport ;

✱ Sir Cyril W. **Hurcomb** ♦, K. B. E., C. B., secretary, Ministry of transport (member of the Permanent Commission) ;

✱ E. W. **Rowntree**, C. B. E., assistant secretary, Ministry of transport ;

✱ Lt. Col. A. H. L. **Mount**, C. B. E., chief inspecting officer of railways, Ministry of transport ;

✱ A. E. **Kirkus**, O. B. E., director of statistics, Ministry of transport ;

✱ C. T. **Cramp**, member of the Ministry of transport, Railway Employment Safety Appliances Committee.

B. — INDIA.

Office of Under secretary of State for India :

D. S. **Burn**, agent, Great Indian Peninsula Railway ;

✱ P. R. **Rau**, director of Finance, Railway Board ;

F. **Palmer**, C. I. E., consulting engineer to the High Commissioner for India ;

✱ Sir Ashley **Biggs** ♦, late agent of the Madras & Southern Mahratta Railway (reporter) ;

✱ C. W. **Lloyd Jones** ♦, C. I. E., agent and chief engineer, His Exalted Highness the Nizam's Guaranteed State Railway (reporter).

C. — DOMINIONS.

Agent general for New South Wales in London :

✱ A. D. J. **Forster**, assistant commissioner to the State Railways.

Irlande (Etat libre d') (Irish Free State).

✱ F. **Cawley**, Secretary of the Legation in Paris.

Grèce (Greece).

Ministère des communications :

✱ G. P. **Bouyoukas**, directeur général des chemins de fer au Ministère des communications.

Italie (Italy).

Ministère des communications :

✱ S. E. Prof. **Belluzo**, Ministre d'Etat ;

✱ Prof. A. **Martelli**, ancien Ministre ;

✱ G. **Salvini**, ingénieur, président du Collège national des ingénieurs des chemins de fer italiens ;

✱ A. **Crispo**, inspecteur général des chemins de fer, tramways et automobiles au Ministère des communications ;

✱ S. **Panunzio**.

Japon (Japan).

Ministry of communications :

✱ S. **Matsunawa** ♦, chief delegate, doctor of engineering, chief of Railway Research Office (reporter) ;

✱ N. **Yumoto**, secretary of the Ministry of the Japanese Government Railways and manager of its Berlin Office (member of the Permanent Commission) ;

✱ E. **Kihara**, engineer ;

✱ S. **Onoe**, engineer ;

✱ S. **Maeda**, secretary ;

H. **Oyama**, secretary ;

✱ S. **Ikegami**, engineer;
S. **Kobayashi**, engineer;
✱ Y. **Ohguimi**, of the Japanese Legation in Madrid.

Luxembourg (Luxemburg).

Direction générale des travaux publics.

Mexique (Mexico).

Secrétariat des communications et des travaux publics.

Norvège (Norway).

Ministère des travaux publics :

✱ A. **Jynge**, administrateur des chemins de fer de l'Etat.

Paraguay.

Ministère des relations extérieures :

✱ F. **Pignet**, consul général attaché à la Légation du Paraguay à Madrid.

Pays-Bas et Colonies (Netherlands and Colonies).

Ministère du Waterstaat :

✱ **J. J. Stieltjes** •, inspecteur général des chemins de fer et des tramways (member of the Permanent Commission);
✱ A. M. **Heuff**, ingénieur d'Etat près l'inspection des chemins de fer.

Gouvernement des Indes néerlandaises :

✱ R. A. E. **Snethlage**, ingénieur en chef, chef de la division voies et travaux des chemins de fer et tramways de l'Etat dans les provinces hors de Java (Buitengewesten);
✱ H. L. **Slinkers**, ingénieur en chef, chef du service auxiliaire, constructions et ponts, du service des chemins de fer et tramways de l'Etat aux Indes néerlandaises.

Pérou (Peru).

Ministère du Fomento:

H. **Boza**, ingénieur.

Pologne (Poland).

Ministère des chemins de fer:

✱ W. **Czapski**, ingénieur, sous-secrétaire d'Etat au Ministère des communications.

Portugal.

Ministère du commerce et des communications :

✱ A. **de Sousa Rego**, ingénieur, directeur général des chemins de fer;
✱ A. **dos Santos Viegas**, ingénieur, professeur à l'Institut supérieur technique;
✱ A. **Teixeira de Queiroz**, ingénieur, adjoint du directeur général des chemins de fer;
✱ C. **Pinto Machado**, ingénieur, chef de la division du matériel et de la traction et des services électriques de la direction générale des chemins de fer;
✱ J. F. **de Souza**, ingénieur, membre du Conseil supérieur des chemins de fer;
✱ R. **da Costa Couvreur**, ingénieur, chef de la division de la voie et des travaux de la direction générale des chemins de fer.

Roumanie (Rumania).

Ministère des travaux publics :

✱ S. **Pretorian**, président du Conseil d'administration des chemins de fer de l'Etat.

Siam.

Ministère des voies de communication :

✱ P. S. **Banchong**;
✱ C. P. **Sandberg**, consulting engineer to the Royal State Railways.

Suède (Sweden).

Ministère de l'intérieur :

A. M. **Granholm** •, directeur général des chemins de fer de l'Etat (member of the Permanent Commission);
L. V. **Stahle**, inspecteur à la direction des ponts et chaussées;
I. **Virgin**, directeur en chef aux chemins de fer de l'Etat.

Suisse (Switzerland).

Département des postes et des chemins de fer :

✱ H. **Hunziker** •, ingénieur, directeur de la division des chemins de fer (member of the Permanent Commission and reporter);
✱ Dr. A. **Rohn**, ingénieur, président du Conseil de l'Ecole polytechnique fédérale;
✱ F. **Stalder**, ingénieur, chef de section à la division des chemins de fer.

Tchécoslovaquie (Czechoslovakia).

Ministère des chemins de fer:

✱ P. **Koller** •, ingénieur, conseiller central (reporter);
✱ St. **Zavadil**, conseiller supérieur.

Uruguay.

Ministère des travaux publics.

Yougoslavie (Royaume de) Jugoslavia (Kingdom of)

Ministère des communications

✱ B. **Djouritchitch** •, ancien directeur général des chemins de fer de l'Etat (member of the Permanent Commission).

B. — Railway administrations affiliated to the association and their Delegates.

Allemagne (Germany).

Deutsche Reichsbahn Gesellschaft (53 790 km. [33 425 miles]) :

✱ Dr. Ing. J. **Dorpmüller** •, Generaldirektor (member of the Permanent Commission);

P. **Wolf** ♦, Geheimrat, Direktor (member of the Permanent Commission) ;
Dr. Ing. O. **Müller** ♦, Reichsbahndirektor (reporter) ;
H. **Nordmann** ♦, Professor, Reichsbahnoberrat (reporter) ;
P. **Wagner** ♦, Reichsbahnoberrat (reporter and section secretary) ;
Dr. Ing. W. **Wechmann** ♦, Reichsbahndirektor (reporter) ;
E. **Dähnick** ♦, Reichsbahnoberrat (reporter) ;
Dr. Ing. P. **Gottschalk** ♦, Reichsbahnrat (reporter) ;
W. **Stäckel** ♦, Reichsbahndirektor (reporter) ;
M. **Leibbrand** ♦, Reichsbahndirektor (reporter and section secretary) ;
Dr. jur. H. **Zietzschmann** ♦, Reichsbahndirektor (reporter and section secretary) ;
Th. **Gaier** ♦, Direktor bei der Reichsbahn (reporter) ;
Dr. Ing. B. **Schwarze** ♦, Geheimer Baurat, Reichsbahndirektor (reporter) ;
H. **Hellenthal**, Reichsbahndirektor ;
K. **Pokorny** ♦, Direktor bei der Reichsbahn (section secretary) ;
M. **Baumann** ♦, Professor, Direktor bei der Reichsbahn (section secretary) ;
R. **Honold**, Vizepräsident ;
Dr. Ing. K. **Tecklenburg** ♦, Reichsbahndirektor (reporter) ;
H. **Hamel**, Reichsbahn-Oberamtmann.

Argentine (République) (Argentine Republic.)

I. — State Railways.

Etat (Chemins de fer de l') (7 275 km. [4 521 miles]).

II. — Private Companies.

Buenos Ayres Great Southern Railway (7 963 km. [4 948 miles]) :
H. C. **Allen**, chairman ;
J. P. **Clarke**, C. B. E., director ;
✱ Sir Sam **Fay**, director ;
Lt. Cl. W. **Parish**, C. M. G., C. B. E., director ;
Lt. Col. R. T. **Harper**, secretary ;
Sir Brodie **Henderson**, K. C. M. G., C. B., consulting engineer ;
✱ N. **Grey**, F. E., assistant secretary ;
P. D. **Saccaggio**, chief mechanical engineer ;
✱ E. A. **Richards**, chief of control office.

Buenos Ayres & Pacific Railway (4 515 km. [2 806 miles]).

Buenos Ayres Western Railway (3 101 km. [1 927 miles]) :
R. **Graham**, secretary ;
Dr. G. E. **Leguizamon**, legal representative ;
✱ W. C. **Williams**, engineer ;
A. M. **Stewart**, engineer in chief.

Central Argentine Railway (5 344 km. [3 321 miles]) :
Goddard, assistant traffic manager ;
✱ **Pank**, locomotive works manager ;
✱ J. R. S. **Fox**, assistant engineer.

Cordoba Central Railway (1 950 km. [1 212 miles]) :
Rt. Hon. Lord **Farrer**, chairman ;
R. **Popkiss**, director.

Entre Rios Railway (1 293 km. [803 miles]) :
A. **Cook**, director ;
J. **Williamson**, director ;
F. A. **Bottomley**, local director ;
W. J. **George**, secretary.

Rosario à Puerto Belgrano (Compagnie du chemin de fer de) (824 km. [512 miles]) :
G. **Hersent**, administrateur ;
✱ J. **Comble**, administrateur ;
✱ R. **de Tilly**, secrétaire général.

Province de Santa Fé (Compagnie française des chemins de fer de la) (1 984 km. [1 233 miles]) :
✱ C. **Bailloud**, administrateur ;
✱ G. **Benac**, administrateur ;
✱ P. **Bouju**, administrateur.

Belgique et Colonie (Belgium and Colony).

A. — BELGIUM.

Société Nationale des chemins de fer belges (4 795 km. [2 980 miles]) :
Permanent Commission of the Association :
✱ E. **Foulon** ♦, directeur général, president of the Permanent Commission ;
✱ U. **Lamalle** ♦, directeur de l'exploitation, vice-president of the Permanent Commission (reporter) ;
✱ A. J. **Jacques** ♦, directeur du service de la voie, member of the Permanent Commission ;
Reporters :
✱ A. A. C. **Ronsse** ♦, ingénieur en chef du service de la voie ;
✱ G. C. A. **Willaert** ♦, ingénieur principal au service de la voie ;
✱ O. **Gaeremynck** ♦, ingénieur principal au service de l'exploitation ;
Other delegates :
✱ O. **Warte**, ingénieur en chef au service du matériel ;
✱ J. **Van Waefelghem**, ingénieur principal au service de la voie ;
✱ C. **Lemaire**, ingénieur principal au service de la voie ;
✱ O. **De Marre**, inspecteur principal au service de l'exploitation ;
✱ J. P. **Van Rijn** ♦, ingénieur principal au service de la voie (principal secretary) ;
✱ E. **Hennig** ♦, ingénieur au service du matériel (principal secretary) ;

Chimay (Chemin de fer de) (61 km. [38 miles]) :

✱ P. **Wauwermans**, administrateur.

Malines-Terneuzen (Chemin de fer de) (68 km. [42 miles]) :

✱ A. **Verwilghen**, vice-président du Conseil d'administration.

Nord français (Chemin de fer du) (lignes Nord-Belges) (170 km . [106 miles]) :

✱ R. **Mayer**, administrateur ;
✱ G. **Philippe** ♦, inspecteur général (member of the Permanent Commission) ;

Vicinaux (Société Nationale des chemins de fer) (4 595 km. [2 855 miles]) :

M. **Levie**, président du Conseil d'administration ;
✱ H. **Debarsy**, administrateur ;
✱ E. **Gevaert**, administrateur ;
✱ Ch. **Gheude**, administrateur ;
✱ A. **De Bruyne**, administrateur ;
P. **Segers**, administrateur ;
H. **Caufriez** ♦, directeur général (member of the Permanent Commission) ;
✱ L. **Jacobs**, directeur général adjoint ;
✱ E. **Van Noorbeeck** ♦, directeur (reporter) ;
✱ G. **Desmedt**, directeur ;
✱ A. **Allard** ♦, directeur (principal secretary).

Compagnie belge de chemins de fer et d'entreprises (188 km. [117 miles]) :

A. **May**, administrateur-délégué.

Compagnie générale d'entreprises électriques et industrielles « Electrobel » (38 km. [24 miles]) :

✱ G. **Crombé**, administrateur.

Liége-Seraing et Extensions (Railways économiques de) (21 km. [13 miles]) :

✱ P. **Beyaert**, ingénieur-directeur.

B. — COLONY.

Bas-Congo au Katanga (Compagnie du chemin de fer du) (1 925 km. [1 196 miles]) :

✱ L. **Jadot**, administrateur-délégué ;
N. **Cito**, administrateur-délégué ;
O. **Jadot**, administrateur ;
P. **Gillet**, directeur ;
E. **Felsenhart**, commissaire.

Congo (Compagnie du chemin de fer du) (400 km. [249 miles]) :

✱ A. **Marchal**, vice-président, administrateur-délégué ;
✱ G. **Gaillard**, chef du service technique.

Congo Supérieur aux Grands Lacs Africains (Compagnie du chemin de fer du) (763 km. [474 miles]) :

G. P. **Camus**, ingénieur, directeur ;
V. **Olsen**, directeur général en Afrique ;
A. **Ernalsteen**, ingénieur, chef du service technique.

Brésil (Brazil).

Est brésilien (Compagnie des chemins de fer de l') (2 257 km. [1 402 miles]) :

Baron A. **Reille**, vice-président du Conseil d'administration ;
H. **Lazard**, administrateur ;
✱ L. **Beck**, ingénieur, chef des services ;
G. **Checacci**, contrôleur de la comptabilité générale ;
G. **Reille**, secrétaire du Conseil d'administration.

Estrada de ferro Sorocabana (2 165 km. [1 345 miles]).

Great Western of Brazil Railway (1 638 km. [1 018 miles]) :

✱ N. B. **Dickson**, director ;
W. M. **Codrington**, secretary ;
✱ H. **Harper**, accountant ;
✱ F. O. **Ellis**, stores superintendent ;
C. T. **Burns**, accountant.

Leopoldina Railway (2 987 km. [1 856 miles]) :

Ch. H. **Pearson**, director ;
A. J. **Cruikshank**, director ;
J. H. **Drury**, secretary.

Rio Grande do Sul (Chemin de fer de) (2 160 km. [1 342 miles]) :

O. **Pereira**, directeur general.

Bulgarie (Bulgaria).

Etat (Chemins de fer de l') (2 285 km. [1 420 miles]) :

✱ J. **Dantschoff** ♦, ingénieur, directeur des constructions (also delegated by the Bulgarian Governemen) ;
✱ S. **Guenkoff**, ingénieur en chef de la traction.

Chili (Chile).

Antofagasta (Chili) and Bolivia Railway (1 293 km. [803 miles]) :

E. W. **White**, chief accountant.

Nitrate Railways (664 km. [413 miles]) :

✱ Sir David **Wilson Barker**, R. D., R. N. R., director ;
W. S. **Eyre**, director ;
✱ D. **Buttle**, ex-general manager, technical advisor.

Taltal Railway (277 km. [172 miles]) :

✱ W. W. **Parish**, director ;
✱ D. R. **Finnis**, secretary.

Chine (China).

I. — State Railways.

Lunghai (Chemin de fer du) (1 800 km. [1 118 miles]).

Pekin-Hankow (Chemin de fer de) (1 200 km. [746 miles]).

II. — Private Companies.

Chemins de fer et tramways en Chine (Compagnie des) (621 km. [386 miles]).

South Manchuria Railway (1 111 km. [690 miles]) :

N. **Sakamoto,** representative in Paris ;
H. **Nakamura**, engineer ;
K. **Fujino,** engineer ;
S. **Morita,** engineer.

Colombie (Columbia).

Columbia Railways & Navigation Company (106 km. [66 miles]) :

Sir Stephen **Killik.**

Société nationale de chemins de fer en Colombie (116 km. [72 miles]) :

A. **Ortmans,** administrateur.

Danemark (Denmark).

I. — State Railways.

Etat (Chemins de fer de l') (2 602 km. [1 617 miles]) :

H. **Flensborg,** directeur de la voie ;
O. H. **Munck,** directeur du matériel et de la traction ;
G. A. **Aalborg,** chef de district ;
H. G. **Dorph,** ingénieur, chef du service de la traction du 2e district ;
H. R. P. **Hiort-Lorenzen,** ingénieur, chef du service de la voie du 1er district ;
E. **Hyllestad,** inspecteur en chef au service du trafic.

II. — Private Companies.

Aalborg Privatbaner (259 km. [161 miles]).

Est de Seeland (Chemin de fer de l') (47 km. [29 miles]) :

A. **Sell,** directeur.

Méridionale (Chemin de fer de la Fionie) (216 km. [134 miles]) :

S. **Neumann,** préfet de la Fionie, chef de la direction ;
J. P. **Stensballe,** membre du Sénat, membre de la direction.

Lolland-Falster (Chemin de fer de) (104 km. [65 miles]) :

✱ Ch. **Tiemroth,** président ;
✱ **Agerskov,** directeur.

Egypte (Egypt).

Etat (Chemins de fer de l') (3 340 km. [2 075 miles]) :

Abdul Hamid **Soliman** Pacha ♦, directeur général (member of the Permanent Commission) ;
✱ Mostafa Hamdi **El Kattan** Bey ♦, ingénieur en chef de la voie et des travaux (delegated by the Egyptian Government and reporter) ;
✱ Youssef **Risgallah** Bey ♦, sous-directeur (delegated by the Egyptian Government) ;
✱ Abdel Ruhman **Hamada** Effendi ♦, chef divisionnaire de la traction (delegated by the Egyptian Government).

Espagne (Spain).

Andalous (Compagnie des chemins de fer) (1 644 km. [1 021 miles]) :

✱ A. **Albuquerque,** administrateur et secrétaire général ;
✱ M. **Gimenez Lombardo** ♦, directeur (member of the Spanish Local Organising Committee) ;
✱ A. **Pastor,** chef adjoint du service commercial ;
✱ J. Martin **Buitrago,** ingénieur du service de la voie ;
✱ E. **Lazarraga,** chef de la direction de la traction.

Aragon (Chemin de fer central de) (302 km. [188 miles]) :

✱ N. **Jacob,** directeur de l'exploitation ;
✱ J. **Rozpide,** secrétaire général.

Cantabrico (Compania del Ferrocaril) (105 km. [65 miles]) :

✱ L. P. **Torrès,** directeur.

Catalans (Compagnie générale de chemins de fer) (201 km. [125 miles]) :

✱ A. **Pirard,** vice-président ;
✱ O. **Lagasse,** directeur.

Economicas de Asturias (Ferrocarriles) (115 km. [71 miles]) :

✱ A. **Coronas.**

Great Southern of Spain Railway (168 km. [104 miles]) :

✱ G. L. **Boag** ♦, general manager (member of the Spanish Local Organising Committee).

Madrid à Saragosse et à Alicante (Compagnie des chemins de fer de) (3 670 km. [2 280 miles]) :

Excmo. Sr. D. Basilio **Beamonte,** sous-directeur ;
✱ Sr. D. Renato **Andre,** ingénieur en chef du matériel et de la traction ;
✱ Sr. D. Federico **de Echeverria,** ingénieur en chef du service du mouvement ;
Sr. D. Eduardo **Perxes,** ingénieur en chef du service des voies et travaux ;

✱ Sr. D. Francisco **Baron,** ingénieur en chef du service des voies et travaux ;

Sr. D. Alberto **Hebrard,** ingénieur, sous-chef du service électrique ;

✱ Sr. D. Emilio **D'Ocon,** attaché au service commercial.

Viallate, attaché au Comité de Paris.

Nord de l'Espagne (Compagnie des chemins de fer du) (3 757 km. [2 335 miles]) :

✱ Marquis de **Caviedes,** administrateur ;
✱ H. **Grasset,** sous-directeur ;
✱ E. **Garre,** sous-directeur ;
✱ F. **de Vargas,** sous-directeur ;
✱ P. P. **de Alarcon,** ingénieur en chef de l'exploitation ;
✱ Ch. **Escolar,** ingénieur en chef des voies et travaux ;
✱ A. **Flobert,** ingénieur en chef, matériel et traction ;
✱ F. **Villamil,** chef de la division commerciale.

Ouest de l'Espagne (Compagnie Nationale des chemins de fer de l') (1 587 km. [986 miles]) :

✱ D. J. M. **Escoriaza,** administrateur ;
✱ D. V. **Messa,** administrateur ;
✱ D. I. Fernandez **de la Somera,** directeur ;
✱ D. A. **Prieto y Vives,** directeur-adjoint ;
✱ F. **del Pino,** ingénieur en chef, voies et travaux.

Utrillas (Chemin de fer et mines d') (127 km. [79 miles]) :

✱ D. Santiago **Baselga y Ramirez,** directeur-gérant.

Etats-Unis d'Amérique (United States of America).

Baltimore & Ohio Railroad (8 808 km. [5 473 miles]) :

✱ H. B. **Voorhees** ♦, vice-president at Chicago (reporter) ;
✱ T. W. **Jacobs,** European traffic manager.

Bessemer & Lake Erie Railroad (360 km. [224 miles]).

Central of Georgia Railway (3 076 km. [1 911 miles]).

Delaware & Hudson Company (1 239 km. [770 miles]) :

✱ H. F. **Burch,** assistant general manager.

Elgin, Joliet & Eastern Railway (340 km. [211 miles]).

Erie Railroad (3 737 km. [2 322 miles]) :

✱ Dr. H. **von Schrenk,** consulting timber engineer ;
✱ E. **Wagner,** safety appliance observer.

Illinois Central Railroad (8 075 km. [5 018 miles]) :

✱ W. H. **Chisholm,** European traffic manager.

Kansas City Southern Railway (1 421 km. [883 miles]).

Lehigh & New England Railroad (293 km. [182 miles]) :

S. D. **Warriner,** president ;
R. H. **Wilbur,** vice-president and general manager.

Long Island Railroad (634 km. [394 miles]).

New York Central Lines (10 232 km. [6 358 miles]) :

R. D. **Starbuck,** vice-president ;
✱ D. R. **Mac Bain,** general manager ;
✱ J. V. **Neubert,** chief engineer, maintenance of way ;
E. **Hungerford,** assistant vice-president, public relations ;
✱ W. L. **Lentz** ♦, engineer, motive power (reporter) ;
G. L. **Bourne,** consulting engineer ;
W. L. **Tedford,** consulting engineer.

Norfolk & Western Railway (3 607 km. [2 241 miles]).

Pennsylvania Railroad System (16 917 km. [10 512 miles]) :

✱ M. W. **Clement,** vice-president, operation ;
✱ G. **Le Boutillier,** vice-president, New York Zone ;
✱ F. W. **Hankins,** chief of motive power ;
✱ A. J. **Ball,** foreign freight traffic manager ;
✱ P. **Allen,** chief engineer M. W., Western Region ;
✱ W. D. **Wiggins,** chief engineer, Central Region.

Pittsburgh, Shawmut and Northern Railroad Company (319 km. [198 miles]) :

J. D. **Dickson,** receiver ;
P. B. Mc **Bride,** assistant to receiver.

Reading Company (2 527 km. [1 570 miles]) :

✱ Ch. H. **Ewing,** vice-president ;
✱ J. V. **Hare,** secretary.

Richmond, Fredericksburg & Potomac Railroad (188 km. [117 miles]).

Wabash Railway (4 064 km. [2 525 miles]) :

W. H. **Williams,** chairman of the Board ;
J. E. **Taussig,** president ;
G. F. **Hess,** superintendent, motive power.

Finlande (Finland).

Etat (Chemins de fer de l') (4 944 km. [3 072 miles]) :

✱ S. A. S. **Gruner,** directeur du service de la construction de la voie ;

✱ W. V. **Airas** ♦, directeur du service de la traction (delegated by the Finnish Government).

France, Algérie, Tunisie, Colonies et Protectorats. (France, Algiers, Tunis, Colonies and Protectorates).

A. — FRANCE.

I. — State Railways.

Etat (Chemins de fer de l') (9 064 km. [5 632 miles]) :

A. **Fontaine**, président du Conseil d'administration ;
✱ J. **Helbronner**, membre du Comité de réseau ;
✱ R. **Dautry** ♦, directeur général (member of the Permanent Commission) ;
✱ P. **Levy**, ingénieur en chef attaché à la direction ;
✱ A. **Direz**, chef de l'exploitation ;
E. **Hauterre**, chef de l'exploitation adjoint ;
✱ A. **Lemonnier**, sous-chef de l'exploitation ;
✱ R. **Soulard**, ingénieur de l'exploitation ;
✱ J. **Nasse**, chef du service du matériel et de la traction ;
✱ R. **Barrier**, ingénieur principal de la traction ;
✱ F. **Surleau**, chef du service de la voie et de bâtiments ;
✱ A. **Porchez**, chef adjoint du service de la voie et des bâtiments ;
✱ J. **Dreyfuss**, chef du service de la construction des lignes nouvelles.

Alsace et de Lorraine (Chemins de fer d') (2 085 km. [1 295 miles]) :

✱ H. **Bauer**, directeur ;
✱ G. **Pader**, ingénieur en chef attaché à la direction ;
✱ Ch. **Frant**, ingénieur en chef de l'exploitation ;
✱ Ch. **Regnauld**, ingénieur en chef du matériel et de la traction ;
✱ Ch. **Aubry**, ingénieur en chef de la voie et des bâtiments ;
✱ Ch. **Spach**, chef-adjoint de l'exploitation.

II. — Private Companies.

Ceinture de Paris (Chemins de fer de) (179 km. [111 miles]) :

✱ M. **Robaglia**, ingénieur en chef.

Est (Compagnie des chemins de fer de l') (5 027 km. [3 124 miles]) :

✱ R. **Fabry**, administrateur ;
✱ M. **Girod de l'Ain**, administrateur ;
P. **Riboud** ♦, directeur (member of the Permanent Commission) ;
✱ P. **Gruson**, secrétaire général ;
✱ R. **Barth** ♦, ingénieur principal attaché à la direction (reporter) ;
E. **Brisse**, ingénieur en chef de l'exploitation ;
✱ E. **Pellarin** ♦, ingénieur en chef adjoint à l'ingénieur en chef de l'exploitation (reporter) ;
✱ R. **Renard**, chef-adjoint de l'exploitation ;
✱ A. **Henry**, ingénieur en chef de la voie et des travaux ;
✱ P. **Bouché-Leclercq**, ingénieur en chef adjoint de la voie et des travaux ;
✱ G. **Patte** ♦, ingénieur en chef attaché au service central de la voie et des travaux (reporter) ;
✱ E. **Duchatel**, ingénieur en chef du matériel et de la traction ;
✱ J. **Loizillon**, ingénieur en chef adjoint du matériel et de la traction ;
✱ Y. **Legrand**, ingénieur principal du matériel roulant.

Midi (Compagnie des chemins de fer du) (4 310 km. [2 678 miles]) :

✱ **Tirard**, président du Conseil d'administration ;
Sergent, vice-président du Conseil d'administration ;
✱ **Paul** ♦, directeur (member of the Permanent Commission) ;
✱ **Berveiller**, secrétaire général administratif ;
Boque, chef de l'exploitation ;
Renault, chef de l'exploitation adjoint ;
✱ **Bachellery**, ingénieur en chef du matériel et de la traction ;
Hallard, ingénieur en chef adjoint à l'ingénieur en chef du matériel et de la traction ;
Bouteloup, ingénieur en chef de la voie ;
Coullié, ingénieur en chef adjoint à l'ingénieur en chef de la voie ;
Bruneau ♦, ingénieur en chef adjoint au chef de l'exploitation (reporter) ;
Leboucher ♦, ingénieur en chef des services techniques du matériel et de la traction (reporter) ;
Farenc ♦, sous-chef de l'exploitation (reporter) ;
Garau, ingénieur en chef de la construction des lignes nouvelles.

Nord (Compagnie du chemin de fer du) (3 830 km. [2 380 miles]) :

✱ M. **de Waru**, administrateur, membre du Comité de direction ;
✱ **Javary** ♦, directeur de l'exploitation (member of the Permanent Commission) ;
✱ A. **Moyrand**, ingénieur en chef de l'exploitation ;
✱ G. **Collin**, ingénieur en chef du matériel et de la traction ;
✱ A. **Moutier**, ingénieur en chef des services techniques ;
✱ A. **Le Poittevin**, ingénieur principal de la traction ;
✱ L. **Toutain**, ingénieur principal des études, matériel des voies et des bâtiments ;
✱ **Soulez** ♦, ingénieur en chef attaché à la direction de l'exploitation (reporter) ;
✱ **Le Besnerais** ♦, chef-adjoint de l'exploitation (reporter) ;
✱ **Cambournac** ♦, ingénieur en chef des études, matériel des voies et bâtiments (reporter) ;
✱ **Lancrenon** ♦, chef-adjoint des services du matériel roulant (reporter) ;
✱ M. **Leroy**, ingénieur principal, chef-adjoint des services du matériel roulant ;
✱ **Cossart** ♦, ingénieur en chef des ateliers de machines (reporter) ;
✱ F. **Tettelin**, ingénieur en chef des travaux et de la surveillance.

Paris à Lyon et à la Méditerranée (Compagnie des chemins de fer de) (9 884 km. [6 142 miles]) :

✱ **A. Silhol**, vice-président du Conseil d'administration ;
Margot •, directeur général (member of the Permanent Commission) ;
Mugniot, ingénieur en chef du service de l'exploitation ;
✱ **Tuja**, sous-chef du service de l'exploitation ;
✱ **Boyaux**, sous-chef du service de l'exploitation ;
✱ **Vallentin**, ingénieur en chef du service du matériel et de la traction ;
✱ **Japiot**, ingénieur en chef-adjoint du service du matériel et de la traction ;
✱ **Richon**, ingénieur en chef du service de la traction ;
Chambon, ingénieur en chef du service du matériel ;
✱ **Parmantier** •, ingénieur en chef-adjoint du service du matériel (reporter) ;
✱ **Reure**, ingénieur du service central du matériel ;
✱ **Quinquet**, ingénieur en chef du service de la voie ;
✱ **de Boulongne**, ingénieur en chef des constructions métalliques ;
✱ **Ruffieux**, ingénieur en chef attaché au service central de la voie.

Paris à Orléans (Compagnie du chemin de fer de) (7 812 km. [4 854 miles]) :

✱ P. **Richemond**, président du Conseil d'administration ;
✱ E. **Rousseau**, administrateur ;
✱ Ch. E. **Heurteau**, administrateur ;
✱ O. **Henry-Gréard** •, directeur (member of the Permanent Commission) ;
✱ F. **Frédault**, secrétaire général ;
✱ J. **Baillargues**, chef de l'exploitation ;
L. **de Boysson** •, ingénieur en chef du matériel et de la traction (reporter) ;
✱ **Balling**, ingénieur en chef du service central de la voie et des travaux ;
✱ Ch. **Epinay**, chef-adjoint de l'exploitation ;
✱ A. **Dubois**, ingénieur en chef adjoint de la voie et des travaux ;
✱ G. **Martin**, ingénieur en chef adjoint du matériel et de la traction ;
✱ **Cardon**, ingénieur en chef, service des machines.

III. — Light Railways.

Bouches du Rhône (Régie départementale des chemins de fer et tramways électriques des) (175 km. [109 miles]).

Cambrésis (Compagnie des chemins de fer du) (120 km.) [75 miles]).

Chauny à Saint-Gobain (Chemins de fer de) (15 km. [9.3 miles]).

Départementaux (Compagnie de chemin de fer) (1 940 km. [1 256 miles]) :

✱ A. **Zens**, administrateur-délégué ;
✱ P. **Beghin** •, directeur (reporter) ;
✱ M. **Beghin**, chef de l'exploitation ;
D. **Ragenard**, ingénieur en chef, voies et travaux ;
E. **Grellier**, ingénieur en chef, matériel et traction.

Départementaux du Tarn (Compagnie des chemins de fer) (150 km. [93 miles]) :

✱ C. **Sapin**, administrateur-directeur.

Economiques (Société générale des chemins de fer) (3 454 km. [2 146 miles]) :

J. **Joubert**, président du conseil d'administration ;
✱ F. **Berthelier**, administrateur ;
✱ M. **Auriol**, administrateur ;
J. **Virlet**, directeur ;
✱ A. **Delille**, sous-directeur ;
G. **de Chevigné**, secrétaire de la direction.

Economiques du Nord (Chemins de fer) (247 km. [153 miles]) :

✱ B. **Guillaume**, directeur d'exploitation ;
✱ H. **Best**, directeur d'exploitation.

Est de Lyon (Chemins de fer de l') (104 km. [65 miles]) :

M. **Cahen**, administrateur-délégué.

Voies ferrées des Landes (Société anonyme des) (363 km. [226 miles]) :

Teissier, président du Conseil d'administration ;
✱ **Gufflet**, délégué du Conseil d'administration.

Nord-Est (Chemins de fer secondaires du) (646 km. [401 miles]) :

✱ P. **Jourdain** •, administrateur-délégué (reporter) ;
✱ **Ternynck**, ingénieur ;
Gossart, directeur ;
Vincent, sous-directeur.

Provence (Chemins de fer de la) (502 km. [312 miles]) :

✱ A. **Just**, administrateur.

Somain à Anzin et à la frontière belge (Chemin de fer de) (37 km. [23 miles]) :

✱ J. **Pauzat**, directeur général adjoint.

Sud-Ouest (Chemin de fer du) (400 km. [249 miles]) :

✱ M. **Robaglia**.

Tramways de l'Ain (Régie départementale des) (436 km. [271 miles]) :

✱ L. **Mallez**, directeur ;
✱ H. **Mielle**, ingénieur en chef du contrôle.

Tramways départementaux des Deux-Sèvres (Compagnie des) (182 km. [113 miles]) :

✱ G. **Tartary**, administrateur-directeur.

Tramways de l'Indre (Compagnie des) (182 km. [113 miles]) :

✱✱ A. **Andriveau**, administrateur.

Vicinaux (Compagnie générale des chemins de fer) (720 km. [447 miles]) :

✱✱ M. **Bouteau**, administrateur.

Voies ferrées d'intérêt local (Compagnie générale des) (513 km. [319 miles]) :

F. **Level**, directeur ;

✱✱ G. **Crépin**, secrétaire de la direction ;

✱✱ A. **Hagneaux**, ingénieur de l'exploitation.

Transports en commun de la région parisienne (Société des) (1 010 km. [628 miles]) :

✱✱ **Bourrel**, inspecteur (section secretary).

B. — ALGERIE ET TUNISIE (ALGIERS AND TUNIS).

I. — State Railways.

Algériens de l'Etat (Chemins de fer) (3 562 km. [2 213 miles]) :

C. **Rouzaud**, directeur ;

J. **Côme**, sous-directeur ;

L. **Jouaville**, chef de l'exploitation ;

M. **Guillet**, chef du service du matériel et de la traction ;

G. **Piroutet**, chef du service de la voie ;

R. **Tessier**, président du conseil de réseau ;

V. **Carles**, vice-président du conseil de réseau.

II. — Private Companies.

Algériens de la Compagnie Paris-Lyon-Méditerranée (P. L. M.) (Chemins de fer) (1 235 km. [767 miles]) :

✱ **Luuyt**, sous-directeur du P. L. M. ;

Jourdain, directeur du réseau algérien P. L. M. ;

✱ **Renevey**, directeur de l'Office central d'études de matériel de chemins de fer, Paris ;

✱ **Dargeon**, sous-chef du service de l'exploitation.

Gafsa (Compagnie des phosphates et du chemin de fer de) (441 km. [274 miles]) :

✱ M. **Pellé**, vice-président ;

✱ L. **Durandeau**, directeur.

Tunisiens (Compagnie fermière des chemins de fer) (1 580 km. [982 miles]) :

✱ J. **Trelat**, président du Conseil d'administration ;

E. **Herscher**, administrateur ;

✱ J. **Brugère**, secrétaire général ;

✱ F. **Dattée**, ingénieur en chef des services techniques ;

J. **Maron**, directeur ;

✱ R. **Debize**, ingénieur en chef, matériel et traction.

C. — COLONIES ET PROTECTORATS (COLONIES AND PROTECTORATES).

Afrique (Africa).

Afrique occidentale française (Chemins de fer de l') (3 182 km. [1 977 miles]) :

J. **Launay**, inspecteur général des travaux publics de l'Afrique occidentale française.

Dahomey (Compagnie française de chemins de fer au) (293 km. [182 miles]) :

P. **Chapuy**, président.

Dakar à Saint-Louis (Chemins de fer de) (264 km. [164 miles]) :

✱ J. **Roland-Gosselin**, président du Conseil d'administration ;

✱ R. **Godfernaux**, administrateur.

Franco-Ethiopien de Djibouti à Addis-Abeba (Chemin de fer) (783 km. [487 miles]) :

✱ R. **Brouillet**, administrateur ;

G. **Camut**, directeur général.

Maroc (Compagnie des chemins de fer du) (579 km. [360 miles]) :

✱ A. **Guérin**, directeur général ;

Simeray ;

✱ E. **Hinglais**, chef du service du matériel et de la traction.

Asie Mineure (Asia Minor).

Damas-Hamah et prolongements (Chemin de fer de) (583 km. [362 miles]) :

✱ Ch. **Sallandrouze de Lamornaix**, président du Conseil d'administration ;

✱ P. **Blanche**, administrateur-délégué ;

✱ L. **Chenut**, administrateur also delegated by the Chemin de fer Smyrne-Cassaba).

Indochine (Indo-China).

Coloniaux de l'Indochine (Chemins de fer) (1 405 km. [873 miles]) :

✱ **Favier**, ingénieur en chef des ponts et chaussées ;

Maux, ingénieur des ponts et chaussées ;

Hébert, ingénieur des ponts et chaussées.

Indochine et du Yunnan (Compagnie française des chemins de fer de l') (860 km. [534 miles]) :

M. **Getten**, vice-président ;

G. **Chemin Dupontes**, directeur général ;

Lécorché, sous-directeur de l'exploitation.

Réunion (Ile de la) (Reunion Isle).

Port et de la Pointe des Galets (Chemin de fer du) (127 km. [79 miles]) :

✱ P. **Jacquinot**, ingénieur en chef du contrôle.

Grande-Bretagne et Nord de l'Irlande, Inde, Dominions, Protectorats et Colonies. (Great-Britain and Northern Ireland, India, Dominions, Protectorates and Colonies).

A. — GRANDE BRETAGNE ET NORD DE L'IRLANDE (GREAT BRITAIN AND NORTH OF IRELAND).

I. — Group Companies.

Great Western Railway (5 900 km. [3 666 miles]) :

Right Hon. Lord **Mildway of Flete**, director ;
✱ Right Hon. John William **Wilson**, director ;
✱ J. **Milne**, C. S. I., general manager ;
✱ F. R. E. **Davis**, secretary ;
✱ R. **Cope**, chief accountant ;
✱ R. H. **Nicholls** •, C. B. E., superintendent of the line (reporter) ;
✱ **Ford**, O. B. E., chief goods manager ;
✱ R. **Carpmael**, chief engineer ;
✱ Ch. S. **Page**, chief docks manager ;
✱ H. L. **Wilkinson** •, assistant to superintendent of the line (reporter) ;
✱ J. A. **Kay**, agent.

London Midland & Scottish Railways (11 185 km. [6 950 miles]) :

✱ Sir Josiah **Stamp** •, G. B. E., chairman of the Company and president of the executive (member of the Permanent Commission) ;
✱ Sir Edwin **Stockton**, director ;
✱ G. R. T. **Taylor**, director ;
✱ D. **Vickers** •, director (member of the Permanent Commission) ;
Glynn, director ;
✱ J. H. **Follows**, vice-president ;
✱ Sir Harold **Hartley**, vice-president ;
✱ Glynne **Roberts**, Secretary of the Company and assistant to the president ;
✱ C. R. **Byrom** •, chief general superintendent (reporter) ;
✱ J. E. **Anderson**, superintendent of motive power ;
✱ J. **Ballantyne**, chief goods manager ;
✱ A. W. **Barrett**, overseas and continental traffic manager.
✱ A. **Newlands**, chief engineer ;
✱ Sir Henry **Fowler** •, chief mechanical engineer (member of the Permanent Commission and reporter).
✱ E. J. H. **Lemon** •, carriage and wagon superintendent (reporter) ;
✱ F. A. **Cortez Leigh**, electrical engineer ;
✱ A. Winter **Gray**, Secretary, Institute of transport ;
✱ Ethel **Smith**, private secretary to chairman.

London & North Eastern Railway (10 448 km. [6 492 miles]) :

✱ H. N. **Gresley** •, C. B. E., chief mechanical engineer (reporter) ;
Ch. M. **Jenkin Jones** •, superintendent, North Eastern Area (reporter) ;
✱ Ch. H. **Newton**, F. A. A., chief accountant ;
✱ W. A. **Fraser**, engineer, Scottish Area ;
✱ J. H. **Smeddle**, O. B. E., locomotive running superintendent, North Eastern Area ;
✱ **Selway**, C. B. E., passenger manager, Southern Area ;
✱ O. V. **Bulleid**, assistant to chief mechanical engineer ;
✱ A. L. **Gibson**, continental traffic manager (South) ;
✱ C. E. R. **Sherrington**, secretary, Railway Research Service :
✱ H. A. **Watson**, light railway consultant ;
✱ A. C. **Stamer**, C. B. E., assistant chief mechanical engineer.

Southern Railway (3 503 km. [2 177 miles]) :

✱ Right Hon. Sir Evelyn **Cecil** •, G. B. E., director (member of the Permanent Commission) ;
✱ Sir Francis H. **Dent** •, C. V. O., director (member of the Permanent Commission) ;
✱ Sir Charles Langbridge **Morgan**, director.
Sir Herbert **Walker**, K. C. B., general manager ;
G. S. **Szlumper**, C. B. E., assistant general manager ;
E. C. **Cox**, C. B. E., M. V. O., chief operating superintendent ;
Ellson •, O. B. E., chief engineer (reporter) ;
Maunsell •, C. B. E., chief mechanical engineer (reporter) ;

II. — Other Companies.

Cheshire Lines Committee (230 km. [143 miles]) :

✱ S. T. **Burgoyne**, manager.

(1) *County Donegal Railways Joint Committee* (208 km. [129 miles]) :

✱ H. **Forbes**, secretary and manager ;
✱ W. K. **Wallace**, chief engineer.

(1) *Great Northern Railway (Ireland)* (896 km. [557 miles]) :

✱ Lt. Col. John, C. W. **Madden**, D. L., director ;
✱ J. B. **Stephens**, general manager ;
✱ G. T. **Glover**, locomotive engineer.

Isle of Man Railway (74 km. [46 miles]).

Kent, Somerset, Shropshire & Welsh Light Railways Group (228 km. [142 miles]) :

H. F. **Stephens**, managing director ;
W. H. **Austen**, inspector of works.

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(1) Also shewn under *Irish Free State*.

Metropolitan Railway (127 km. [79 miles]) :

R. H. **Selbie**, C. B. E., managing director.

London Midland & Scottish Railway (Northern Counties Committee (449 km. [279 miles]) :

✱ Lt. Col. Right Hon. Viscount **Massereene & Ferrard**, D. S. O. ;
✱ **Somerset**, M. P., director.

Underground Electric Railways Company of London (125 km. [77 miles])

Midland & Great Northern Railways Joint Committee (295 km. [183 miles]) :

✱ F. **Tatlow**, director.

Great Central & Midland Joint Committee (63 km. [39 miles]) :

✱ H. V. **Mosley**, chief executive officer for new works and parliamentary business (L. M. S. Railway).

B. — INDIA, DOMINIONS, PROTECTORATES AND COLONIES.

Afrique (Africa).

Gold Coast Government Railways (803 km. [499 miles]) :

✱ R. **Higham**, deputy general manager.

Kenya and Uganda Railway (2 423 km. [1 506 miles]) :

A. E. **Hamp**, acting chief engineer ;
J. S. **Coney**, chief assistant to general manager ;
✱ T. **Neilson**, divisional superintendent.

Mashonaland Railway (1 228 km. [763 miles]).

Nigerian Railway (2 864 km. [1 780 miles]) :

W. C. **Bostock**, deputy general manager ;
E. **Harper**, assistant to general manager ;
A. **Gibbons**, acting chief accountant ;
H. W. **Lawson**, assistant chief engineer ;
H. **Creighton**, assistant divisional superintendent ;
J. Ogilvie, divisional engineer.

South African Railways and Harbours (19 986 km. [12 419 miles]) :

✱ J. S. de V. **von Willich** ♦, B. Sc., A. M. I. C. E. advisory engineer (member of the Permanent Commission) ;
✱ A. G. **Watson**, chief mechanical engineer.

Sudan Government Railways and Steamers (3 205 km. [1 992 miles]) :

A. C. **Parker**, C. B. E., general manager ;
✱ D. **Henderson**, new works engineer ;
✱ H. D. **Bindley**, assistant maintenance engineer.

Australasie (Australasia).

New South Wales Government Railways (9 253 km. [5 750 miles]) :

✱ L. M. **Grouse**, tour secretary and publicity officer.

New Zealand Government Railways (5 118 km. [3 180 miles]).

South Australia Government Railways (4 090 km. [2 541 miles]).

Canada.

Canadian National Railways (36 160 km. [22 469 miles]) :

✱ A. J. **Hills**, assistant vice-president, operation ;
✱ E. P. **Mallory**, director, bureau of statistics ;
✱ R. G. **Gage** ♦, chief electrical engineer (reporter) ;
✱ N. M. **Clougher**, consulting engineer ;
✱ C. E. **Brooks** ♦, chief of motive power (reporter).

Quebec Central Railway (476 km. [296 miles]).

Canadian Pacific Railway (23 847 km. [14 818 miles]) :

✱ D. C. **Coleman**, vice-president of Western lines ;
✱ Sir George McLaren **Brown**, European general manager.

Ceylan (Ceylon).

Ceylon Government Railways (1 531 km. [951 miles]) :

T. E. **Dutton**, general manager ;
✱ A. G. **Cooper**, acting engineer of way and works ;
✱ A. S. **Bobby**, mechanical engineer.

Inde (India).

Bengal Nagpur Railway (4 910 km. [3 051 miles] :

Sir T. Rashleigh **Wynne**, managing director ;
Ch. E. **Chase**, acting chief mechanical engineer ;
Th. R. **Neely**, commercial traffic manager ;
✱ F. S. **Hughes**, acting chief engineer ;
✱ E. A. **Byrde**, district engineer.

Bengal & North Western Railway (3 333 km. [2 071 miles]) :

✱ Sir Henry P. **Burt**, H. C. I. E., C. B. E., chairman ;
Sir George **Sutherland**, director ;
✱ Lt. Col. Thomas **Gracey**, R. E., director ;
✱ Lt. Col. W. R. **Izat**, D. S. O., R. E., managing director ;
✱ Randall H. **Dennis**, O. B. E., chief engineer ;
✱ John D. **Westwood**, traffic manager.

Bombay, Baroda & Central India Railway (6 199 km. [3 852 miles]) :

Major R. E. **Shelley**, A. D. G., chairman ;

A. R. **Barrand**, director;
Major Gen. Sir H. F. E. **Freeland**, K. C. I. E., C. B., director;
Sir Seymour B. **Tritton**, consulting engineer;
H. P. **Jones**, deputy chief engineer;
A. J. **May**, executive engineer;
R. **Donaldson**, district locomotive superintendent;
D. J. T. **Jamieson**, district traffic superintendent;
✱ S. G. S. **Young**, secretary.

Burma Railways (3 251 km. [2 020 miles]) :
✱ B. M. **Crosthwaite**, traffic manager;
✱ R. A. **Brereton**, chief accounts officer;
Ch. I. **Hutton**, locomotive, carriage and wagon superintendent;
J. E. M. **Rowland**, deputy chief engineer;
✱ E. **Procter**, assistant engineer;
N. H. **Cook**, district carriage & wagon superintendent;
✱ Ch. P. **Brewith**, district traffic superintendent;
N. de Courcy **Hardwick**, district traffic superintendent.

Eastern Bengal Railway (State Railway of India) (3 013 km. [1 872 miles]) :
✱ A. E. B. **Sullen**, deputy, chief engineer;
✱ H. A. **Joscelyne**, executive engineer;
P. B. Mc **Gowan**, district traffic superintendent;
A. A. I. **French**, assistant traffic superintendent;
L. N. **Flatt**, deputy locomotive superintendent, running;
✱ W. R. R. **Bennett Moore**, signal engineer;
H. G. **Scotter**, district locomotive superintendent;
✱ R. C. **Case**, deputy director, Stores Railway Board, Government of India.

East Indian Railway (State Railway of India) (6 732 km. [4 183 miles]) :
✱ Lt. Col. L. E. **Vining**, V. D. Offg. deputy chief operating superintendent;
✱ L. H. **Swain**, bridge engineer;
✱ **Bury**, R. E., works manager.

Great Indian Peninsula Railway (5 954 km. [3 700 miles]) :
D. S. **Burn**, agent;
O. G. **Edwards**, district engineer;
✱ F. W. C. **Fowle**, divisional engineer;
✱ R. V. **Hitchcock**, assistant to chief engineer;
✱ Wm. **Hood**, bridge engineer;
R. B. **Gibson**, assistant transportation superintendent;
✱ J. **Scott**, deputy agent;
✱ J. H. F. **Raper**, deputy traffic manager (rates & claims);
D. H. **Hewitt**, works manager;
✱ J. E. **Bottomley**, works manager.

Madras and Southern Mahratta Railway (5 195 km. [3 228 miles]) :
Col. W. V. **Constable**, R. E., chairman;
Lt. Col. H. **Bonham-Carter**, director;
✱ Sir Francis **Dundas Couchman**, director;
Brig. Gen. Sir Charles Lane **Magniac**, C. M. G., O. B. E., secretary;
✱ J. G. **Marsh**, V. D., M. Inst. C. E., chief engineer;
A. C. **Rendell**, V. D., M. Inst. Loc. E., deputy transportation superintendent (operating, power);
A. W. **Parsons**, V. D., M. Inst. T., deputy transportation superintendent (commercial).

North Western Railway (State Railway of India) (11 001 km. [6 836 miles]) :
✱ R. **Proudlock**;
Lt. Col. C. S. M. C. **Watson**, D. S. O., O. B. E., R. E., chief operating superintendent;
✱ C. E. **Spurgeon**, chief mechanical engineer;
V. **Bayley**, C. I. E., C. B. E., controller of stores;
✱ M. D. B. **Trevor**, O. B. E., divisional superintendent,
✱ F. S. **Bond**, divisional superintendent;
✱ Lt. E. C. S. **Stowell**, R. E.;
✱ W. T. **Everall**. O. B. E., bridge engineer;
✱ **Griffin**, O. B. E., executive engineer;
✱ Cap. R. W. P. **Yates**, R. E., senior assistant bridge engineer;
✱ W. T. **Biscoe**, divisional transportation officer;
✱ Major R. E. **Gordon**, M. C., R. E.;
S. E. **West**, O. B. E., divisional commercial officer.

Rohilkund and Kumaon Railway (920 km. [572 miles]).

South Indian Railway (3 692 km. [2 294 miles]).

Malaisie (Malay Peninsula).

Federated Malay States Railways (1 780 km. [1 106 miles]).

Mesopotamie (Mesopotamia).

Iraq State Railways (1 218 km. [757 miles]) :
G. D. **Main**, chief auditor & financial secretary;
N. P. **O'Reilly Blackwood**, traffic manager;
✱ A. L. **Holt**, district engineer;
F. R. **Lewis**, electrical engineer.

Irlande (Etat libre d') (Irish Free State).

(1) *County Donegal Railways Joint Committee* (201 km. [125 miles]) :
✱ H. **Forbes**, secretary & manager;
✱ W. K. **Wallace**, chief engineer.

(1) *Great Northern Railway (Ireland)* (896 km. [557 miles]) :
✱ Lt. Col. John C. W. **Madden**, director;

(1) Also shewn under *Great Britain and Northern Ireland.*

✱ J. B. **Stephens,** general manager;
G. T. **Glover,** locomotive engineer.

Greath Southern Railways (Ireland) (3 520 km. [2 187 miles]) :
✱ Sir Walter **Nugent,** Bart., chairman;
✱ Rt. Hon. James **Mac Mahon,** director;
Arthur **Jackson,** director;
J. P. **Goodbody;** director;
C. D. **Evans,** director;
P. J. **Brady,** director;
✱ J. X. **Murphy,** T. D., director;
✱ Lt. Col. T. A. E. **Cairnes,** director.

Jamaïque (Jamaica).

Jamaica Government Railways (337 km. [209 miles]) :
J. **Powter,** director.

Grèce (Greece).

I. — State Railways.

État (Chemins de fer de l') (1 320 km. [820 miles]) :
✱ S. **Koronis,** directeur général;
G. **Doumas,** vice-président du Conseil d'administration;
N. **Bogdanos,** conseiller technique de la traction et de l'exploitation;
Papaïoamnon, ingénieur-inspecteur au Ministère des communications;
✱ **Melissinos,** directeur du 2e arrondissement.

II. — Private Lines.

Nord-Ouest de Grèce (Compagnie du chemin de fer du) (68 km. [42 miles]).

Pirée-Athènes-Péloponèse (Chemins de fer) (750 km. [466 miles]) :
✱ Général J. **Petridis,** administrateur-délégué;
G. **Zissimatos,** ingénieur en chef du matériel et de la traction;
G. **Papalexandros,** ingénieur du service de l'exploitation.

Thessalie (Compagnie des chemins de fer de) (223 km. [145 miles]).

Italie (Italy).

I. — State Railways.

Etat (Chemins de fer de l') (16 749 km. [10 408 miles]) :
Oddone ♦, directeur général (member of the Permanent Commission);
✱ **Fabris** ♦, conseiller (member of the Permanent Commission);
✱ **Fiori** ♦, conseiller (member of the Permanent Commission);
✱ **Ehrenfreund** ♦, chef départemental (reporter);
✱ **Fava** ♦, ingénieur en chef supérieur (reporter);
✱ **Belmonte** ♦, ingénieur en chef supérieur (reporter);
✱ **Bianchi** ♦, inspecteur en chef (reporter);
✱ L. **Velani,** vice-directeur général;
Amedeo **Cuttica,** inspecteur principal, service matériel et traction;
✱ Gustavo **Falcone,** chef de service principal;
✱ Angelo **Landra,** inspecteur en chef du mouvement;
✱ S. **Maltese,** inspecteur en chef, service du mouvement;
✱ E. **Merucci,** inspecteur en chef supérieur;
B. **Nobili,** chef de service principal;
✱ G. C. **Palmieri,** inspecteur en chef supérieur;
✱ G. **Pedemonti,** inspecteur en chef;
✱ E. **Ponticelli,** chef de service;
✱ B. **Renda,** inspecteur principal;
✱ G. **Simoni,** inspecteur principal;
✱ L. **Tosti,** inspecteur en chef supérieur;
✱ C. **Valeri,** inspecteur en chef supérieur;
✱ **Giovene,** inspecteur en chef supérieur;
✱ **Farné,** inspecteur;
✱ **Gordini,** inspecteur.

II. Principal Private Companies.

Méditerranée (Société italienne des Chemins de fer de la) (329 km. [204 miles]) :
✱ R. **Luzzati,** directeur général;
✱ E. **Lissoni,** Ragioniere centrale.

Nationale (Société) de chemins de fer et de tramways (174 km. [108 miles]) :
✱ L. **Ottone.**

Milan (Chemins de fer du Nord de) (266 km. [165 miles]) :
✱ Ing. A. **de Benedetti,** chef de service;
R. **Misrachi,** conseiller.

Vénitienne (Société) pour la construction et l'exploitation de chemins de fer secondaires en Italie (555 km. [345 miles]) :
Prof. Dante **Poli,** directeur;
G. **Fattori,** ingénieur, chef de service;
R. S. **Burlini,** chef de la comptabilité.

III. — Secondary Private Companies.

Apennin Central (Société des chemins de fer de l') (135 km. [84 miles]) :
✱ Ing. Ch. **Anghileri,** administrateur-délégué.

Canavèse (Société du chemin de fer central et tramways du) (59 km. [37 miles]) :
✱ Ing. G. B. **Mossetto,** administrateur-délégué.

Reggio Emilia (Société pour les chemins de fer) 71 km. [44 miles]) :

Conte Comm. Giuseppe **Borini Tacoli,** directeur de l'exploitation, président de l'Association régionale fasciste des transports.

Salentine (Société anonyme du chemin de fer de) (Gestione Governativa delle Ferrovie Salentine) (243 km. [151 miles]) :

✱ V. **Perrone,** commissaire du Gouvernement ;
✱ M. **Failla,** directeur.

Sardaigne (Société pour les chemins complémentaires de la) (697 km. [433 miles]) :

✱ St. **Scano,** directeur général ;
✱ M. **Giacomo,** secrétaire du Conseil ;
G. **Luzzatti,** administrateur.

Suzzara Ferrara (Chemin de fer de) (82 km. [51 miles]).

IV. — Light Railways.

Circumetnea (Chemin de fer) (Société sicilienne de travaux publics) (120 km. [75 miles]).

Emilienne (Société de chemins de fer, tramways et automobiles) (120 km. [75 miles]) :

E. **Guastalla,** directeur.

Lombardie et Romagnes (Tramways de) (175 km. [109 miles]) :

Ch. **Thonet,** président du Conseil d'administration.

Milan-Bergame-Crémone (Tramways à vapeur interprovinciaux de) (136 km. [85 miles]) :

Dr. Galileo **Motta,** conseil légal et technique.

Piémontais (Tramways à vapeur) (198 km. [123 miles]) :

✱ P. **Lo Balbo,** directeur.

Tessin (Chemin de fer du) (242 km. [150 miles]) :

G. **Motta,,** président du Conseil d'administration, député ;
✱ P. **Giovanola,** administrateur-délégué.

Tranvia Elettriche Bresciane (210 km. [130 miles]).

Trazione Elettrica Lombarda (Società) (105 km. [65 miles]) :

✱ F. **Rossi,** ingénieur.

Trazione et Ferrovie Elettriche Toscane (Società) (41 km. [26 miles]).

Turinoise (Société de tramways et de chemins de fer économiques (76 km. [47 miles]) :

✱ Ch. **Boglione,** directeur d'exploitation.

Vercellesi (Tramways) (112 km. [70 miles]) :

✱ I. **Migliau,** ingénieur-directeur.

Japon (Japan).

Japanese Government Railways (12 867 km. [7 995 miles]) :

✱ Ing. Shinta **Matsunawa** •, chief of Railway Research Office, also delegated by the Japanese Government (reporter) ;
✱ N. **Yumoto** •, secretary of the Ministry of railways and manager of its Berlin Office (member of the Permanent Commission) ;
✱ E. **Kihara** •, engineer (delegated by the Japanese Government) ;
✱ S. **Onoe** •, engineer (delegated by the Japanese Government) ;
✱ S. **Maeda** •, secretary (delegated by the Japanese Government) ;
H. **Oyama** •, secretary (delegated by the Japanese Government) ;
✱ S. **Ikegami** •, engineer (delegated by the Japanese Governement) ;
S. **Kobayashi** •, engineer (delegated by the Japanese Government) ;
✱ Y. **Kozai,** engineer ;
✱ J. **Nakahara,** engineer ;
✱ E. **Kobinata,** engineer ;
✱ S. **Saito,** advisor.

Government General of Chosen (2 344 km. [1 457 miles]) :

✱ Ing. Shinta **Matsunawa** •, chief of Railway Research Office (delegated by the Japanese Government and the Japanese Government Railways).

Luxembourg (Luxemburg).

Guillaume-Luxembourg (Chemin de fer) (207 km. [129 miles]) :

✱ F. **Jac,** secrétaire général ;
✱ F. **Colbert,** inspecteur principal.

Prince Henri (Chemins de fer et Minières) (250 km. [155 miles]) :

✱ A. **Sorel,** administrateur-délégué.

Mexique (Mexico).

Ferrocarriles Nacionales de Mexico (12 005 km. [7 460 miles]).

Norvège (Norway).

Etat (Chemins de fer de l') (3 467 km. [2 154 miles]) :

✱ N. H. **Ruud,** directeur, à Trondhjem ;
✱ O. **Berner,** directeur, à Arendal ;
✱ H. **Buche,** ingénieur en chef.

Pays-Bas et Colonies (Netherlands and Colonies).

A. — CONTINENT.

Chemins de fer Néerlandais (Compagnie pour l'exploitation des chemins de fer de l'Etat néerlandais grand Compagnie du chemin de fer hollandais (3 675 km. [2 284 miles]) :

✱ W. F. H. **Rijckevorsel,** inspecteur en chef ;
✱ H. E. **Hoekstra,** chef du service de la traction ;
✱ H. J. **van Lessen,** chef du bureau des études de la traction électrique ;
✱ Ch. H. J. **Driessen** ♦, chef de la superstructure de la voie (reporter) ;
✱ W. **Simon Thomas,** ingénieur, chef de division du service technique de l'exploitation.

Light Railways.

Breskens-Maldegem (Tramways à vapeur de) (69 km. [43 miles]).

Sud Néerlandais (Tramways à vapeur du) (100 km. [62 miles]) :

✱ P. **Beyaert,** ingénieur.

B. — COLONIES.

Chemins de fer de l'Etat aux Indes néerlandaises (4 349 km. [2 702 miles]) :

✱ R. A. E. **Snethlage** ♦, ingénieur en chef des voies et travaux de Sumatra (delegated by the Dutch Indies Government) ;
✱ H. L. **Slinkers** ♦, ingénieur en chef de la construction des ponts (delegated by the Dutch Indies Government) ;

Société des Chemins de fer aux Indes Néerlandaises (863 km. [536 miles]) :

J. **Kraus,** président du Conseil d'administration ;
✱ W. H. **Van Schouwenburg,** ingénieur en chef.

Semarang-Cheribon (Société des Tramways à vapeur) (388 km. [241 miles]) :

G. P. Y. **Caspersz,** directeur ;
Van Alphen, directeur.

Pologne (Poland).

Etat (Chemins de fer de l') (17 241 km. [10 713 miles]) :

✱ A. **Frank** ♦, ingénieur, directeur de département au Ministère des communications (member of the Permanent Commission) ;
✱ Ing. A. **Wasiutyński** ♦, professeur à l'Ecole polytechnique à Varsovie (reporter) ;
Dr. A. **Galecki,** directeur de département au Ministère des communications ;
✱ Ing. W. **Bieniecki,** directeur de la Direction régionale des chemins de fer à Varsovie ;
✱ Ing. J. **Berkiewicz,** membre du Conseil des chemins de fer de l'Etat ;
Prof. Jozef **Gieysztor,** chef de division au Ministère des communications ;
✱ Dr. Z. **Taszycki,** chef de division au Ministère des communication ;
✱ Ing. S. **Wasilewski,** chef de division au Ministère des communications ;
✱ Ing. A. **Tuz,** chef de division au Ministère des communications ;
✱ Ing. H. **Jezierski,** conseiller au Ministère des communications ;
✱ Ing. S. **Tarwid,** chef de division de la direction régionale à Lwow.

Portugal.

A. — CONTINENT.

Beira Alta (Compagnie des chemins de fer portugais de la) (253 km. [157 miles]) :

✱ L. Ferreira da Silva **Vianna,** administrateur-délégue,
✱ J. J. D'Andrade e Silva **Abranches,** directeur d'administration.

Compagnie des Chemins de fer Portugais (2 419 km. [1 503 miles]) :

✱ Antonio de **Vasconcellos Correia,** vice-président du Conseil d'administration ;
Jao de Fontes Ferreira **de Mesquita,** directeur général ;
✱ Alvaro **de Lima Henriques,** sous-directeur ;
✱ Antonio-Vicente **Ferreira,** ingénieur, chef de division ;
✱ Carlos **Bastos,** ingénieur, chef de la direction de l'exploitation ;
✱ Jorge **Malheiro,** ingénieur, chef de la division du matériel et de la traction.

Compagnie nationale des Chemins de fer Portugais (333 km. [207 miles]) :

✱ P. J. **Diniz.** administrateur-délégué ;
✱ C. J. **Diniz,** ingénieur conseil.

B. — COLONIES.

Etat (Chemins de fer de l') (1 049 km. [652 miles]) :

✱ E. J. **Navarro,** directeur général ;
✱ A. A. Lisboa **de Lima,** sous-directeur général ;
✱ C. M. **Ferreira Torrès,** sous-chef de l'exploitation ;
✱ J. T. **Gonçalves,** ingénieur.

Port et Chemin de fer de Lourenço-Marques (430 km. [267 miles]) :

✱ **Prata Dias,** ingénieur, chef de l'exploitation ;
✱ V. **de Waegenaere,** agent commercial.

Roumanie (Rumania).

Etat (Chemins de fer de l') (11 616 km. [7 218 miles]) :

✱ S. **Pretorian** ♦, président du Conseil d'administration (delegated by the Rumanian Government) ;

S. **Vidrighin**, directeur général ;
✱ C. **Mereutza** ♦, sous-directeur général (member of the Permanent Commission and reporter) ;
✱ J. **Miclesco**, directeur de l'exploitation ;
✱ T. **Bals** ♦, directeur (reporter) ;
C. **Paunescu**, directeur ;
V. **Stoïca**, directeur ;
✱ T. **Sfintescu**, ingénieur général de contrôle.

Salvador.

Salvador Railways (161 km. [100 miles]) :

B. E. **Holloway**, director.

Suède (Sweden).

Etat (Chemins de fer de l') (6 465 km. [4 017 miles]) :
✱ I. **Virgin**, directeur en chef ;
✱ G. **Jacobi**, directeur ;
✱ I. **Öfverholm**, directeur ;
✱ C. **Ölofsson**, directeur ;
C. A. **Stjerna**, directeur ;
K. **Svensson**, directeur ;
✱ G. **Dahlbeck**, chef d'arrondissement.

Bergslagen (Chemin de fer de) (552 km. [343 miles]) :
✱ A. **Norrby**, managing director ;
✱ G. **Simonsson**, engineer ;
✱ **Bengtzon**, assistant chief mechanical engineer.

Blekinge Kustbanor (203 km. [126 miles]) :
I. **Hagströmer**, gouverneur de la province de Blekinge ;
✱ I. **Holmgren**, directeur de l'exploitation.

Boras Herrljunga och Varberg-Boras (Chemin de fer (127 km. [79 miles]) :
✱ H. **von Porat**, ingénieur, chef du chemin de fer.

Gefle-Dala (Société du chemin de fer) (293 km. [182 miles]) :
F. **Nordström**, locomotive superintendent.

Göteborg-Boras & Boras Alfvesta (Chemin de fer) (261 km. [162 miles]) :
C. **Sprinchorn**, directeur en chef ;
✱ A. **Forssman**, secrétaire.

Halmstad-Nässjö (Chemin de fer) (411 km. [255 miles]) :
✱ Cap. O. **Wallenberg**, administrateur ;
✱ Comm. A. **Wiman**, directeur en chef.

Helsingborg-Hässleholm (Chemin de fer) (122 km. [76 miles]) :
✱ Baron A. **Thott**. directeur.

Kalmar-Nya (Chemin de fer de) (195 km. [121 miles]) :
✱ V. **Stahle**, chef des chemins de fer de Kalmar.

Karlskrona-Växjö (Chemin de fer) (114 km. [71 miles]) :
L. L. **Lundquist**, chef de l'exploitation.

Karlstad - Munkfors - Nordmarks - Klarelfvens - Filipstads-Norra-Bergslagen (Chemins de fer) (171 km. [106 miles]) :
✱ K. A. **Pallin**, traffic manager.

Kristianstad-Hässleholm (Chemin de fer) (116 km. [72 miles]) :
✱ N. **Greger**, traffic manager.

Nässjö Oskarshamm (Chemin de fer) (148 km. [92 miles]) :
✱ C. **Jönsson**, traffic manager.

Nora-Bergslagen (Chemin de fer) (173 km. [107 miles]) :
✱ E. **Hildebrand**, managing director.

Norra-Östergötland (Société du Chemin de fer de) (134 km. [83 miles]) :
✱ Com. E. M. **Lindgren**, directeur en chef.

Norsholm-Westervick-Hultsfred (Chemin de fer de) (245 km. [152 miles]) :
Cap. J. V. **Mattsson**.

Oxelösund Flen-Västmanlands (Chemin de fer) (300 km. [186 miles]) :
✱ J. **Johnson**, general manager ;
✱ H. O. **Johnson**, locomotive superintendent.

Stockholm-Roslag (Chemin de fer) (238 km. [148 miles]) :
✱ A. **Nerell**, general manager ;
✱ H. **Ekholm**, road engineer.

Stockholm-Vesteras-Bergslagen (Chemin de fer) (479 km. [298 miles]) :
✱ W. **Murray**, président du Conseil d'administration ;
✱ A. **Kamph**, administrateur-délégué.

Trafikförbundet-Uppsala-Norrland (505 km. [314 miles]) :
✱ E. O. **von Friesen**, directeur en chef ;
✱ Dr. I. **Halberg**, directeur.

Uddevalla-Venersborg-Herrljunga (Chemin de fer de) (92 km. [57 miles]).

Vastergötland-Göteborg (Chemin de fer) (380 km. 236 miles]) :

Col. J. **Nyström,** chief director & manager ;
O. **Carlander,** director.

Suisse (Switzerland).

I. — Standard Gauge Lines.

Fédéraux (Chemins de fer) (2 942 km. [1 828 miles]) :

Dr. **Schrafl** ♦, président de la Direction générale (member of the Permanent Commission) ;
Grüber, ingénieur, 1er chef de section à la division des travaux ;
Labhart, directeur du 2e arrondissement ;
Weiss, ingénieur en chef ;
von Werdt, ingénieur en chef de la voie ;
Müller, ingénieur en chef de la traction ;
Dr. **Cottier,** secrétaire général ;
Herold, directeur du 3e arrondissement ;
Savary, directeur du 1er arrondissement.

Alpes Bernoises (Berne-Loetschberg-Simplon) (Compagnie des chemins de fer des) (253 km. [157 miles]) :

✱ F. **Volmar,** directeur.

II. — Narrow Gauge Lines.

Birsig (Chemin de fer de la vallée de) (17 km. 11 miles]) :

✱ W. **Leder,** directeur.

Rhétique (Chemin de fer) (276 km. [172 miles]) :

✱ E. **Bernasconi,** Oberingenieur ;
P. **Bener,** Sektionsingenieur.

Viège à Zermatt (Chemin de fer de) (35 km. [22 miles]) :

✱ A. **Marguerat** ♦, directeur (member of the Permanent Commission).

Yverdon à Sainte-Croix (Compagnie du chemin d') 25 km. [16 miles]) :

✱ E. **Jeanneret,** directeur.

III. — Rack and Cable Railways.

Lausanne à Ouchy (Chemin de fer de) (2 km. [1.3 miles]) :

✱ G. **Mercier,** administrateur.

Tchécoslovaquie (Czechoslovakia).

Etat (Chemins de fer de l') (12 429 km. [7 723 miles]) :

J. **Hauer** ♦, ingénieur, conseiller ministériel (reporter) ;
✱ P. **Koller** ♦, ingénieur, conseiller central (reporter) ;
✱ C. **Fiala** ♦, ingénieur, conseiller technique principal (reporter) ;
E. **Kejr** ♦, ingénieur, conseiller technique principal ; (member of the Permanent Commission) ;
✱ J. **Hondl,** conseiller ministériel ;
✱ Dr. J. **Ourednicek,** conseiller ministériel ;
✱ Ing. O. **Hendrick,** conseiller ministériel ;
Dr. L. **Vonek,** conseiller de section ;
✱ Ch. **Runt,** ingénieur, directeur d'administration ;
✱ **Reynek,** ingénieur, conseiller technique principal.

Turquie (Turkey).

Etat (Chemins de fer de l') (2 240 km. [1 392 miles]).

Smyrne-Cassaba et prolongements (Chemin de fer de) (701 km. [436 miles]) :

✱ J. P. **Monod,** vice-président du Conseil d'administration ;
✱ L. **Chenut** ♦, administrateur (also delegated by Chemin de fer de Damas-Hamah et prolongements) ;
✱ R. **Vallentin,** secrétaire du Comité de direction.

Uruguai (Uruguay).

Central Uruguay Railway of Montevideo (1 577 km. [980 miles]) :

F. **Henderson,** chairman ;
✱ W. **Higgins,** director ;
H. O. **Tubby,** secretary.

North Western of Uruguay Railway (182 km. [113 miles]) :

✱ G. W. **Teague,** general manager.

Yougoslavie (Jugoslavia).

Etat (Chemins de fer de l') (9 226 km. [5 733 miles]) :

✱ D. **Markovitch,** chef de la division commerciale ;
✱ Z. **Zavadjil** ♦, directeur-adjoint (reporter) ;
✱ D. **Chreplovitch,** chef de la division des voies et travaux ;
✱ M. **Yoyitch,** chef de la division de traction ;
✱ **Yvkovitch,** chef de section ;
✱ B. **Ribitch,** chef de section ;
✱ E. **Krick** ♦, ingénieur, inspecteur de la direction générale (reporter) ;
✱ A. **Pavlovitch,** fonctionnaire au service de l'exploitation.

C. — Delegates of Associations affiliated to the International Railway Congress Association.

American Railway Association :

✱ H. J. **Forster,** secretary.

Compagnie auxiliaire internationale de Chemins de fer :

✱ V. Ch. **Caspers,** directeur.

Compagnie Internationale des Wagons-Lits et des Grands Express Européens :

✱ Baron R. **Snoy**, administrateur-directeur général ;

✱ R. **Margot**, directeur général adjoint ;

J. **Müntz**, ingénieur en chef des études et des constructions ;

F. **Woytt**, ingénieur en chef adjoint du service des ateliers et de l'entretien ;

O. **Viglione**, directeur pour l'Italie ;

✱ P. **Loth**, directeur de l'exploitation générale.

Confederazione nazionale fascista dei Trasporti terrestri e della Navigazione interna :

✱ On. Com. C. **Marchi** ♦, président (member of the Permanent Commission) ;

Prof. R. **Trevisani**, secrétaire général ;

✱ Ing. P. **Biraghi**, conseiller technique ;

✱ Ing. Com. **Vanzi**, conseiller technique ;

✱ Ing. A. **Ferrario**, conseiller technique ;

✱ Ing. P. **Giovanola** ♦, conseiller technique (also delegated by the Chemin de fer du Tessin) ;

✱ Ing. G. **Ottone** ;

Ing. C. **Bertone**, conseiller technique ;

✱ A. **Petrucci**, secrétaire.

Railway Clearing House (Great-Britain) :

✱ Sir Francis **Dent** ♦, chairman (member of the Permanent Commission) ;

✱ P. H. **Price**, secretary ;

✱ E. E. **Painter**, principal assistant to secretary.

Union Internationale des Chemins de fer :

G. **Leverve**, secrétaire général ;

✱ A. **Pourcel**, secrétaire général suppléant.

Union des Chemins privés Suédois. (Svenska Järnvägsföreningen) :

✱ O. **Bärnheim**, directeur en chef ;

✱ F. **Wickström**, chef de l'exploitation.

Union des Voies ferrées et des Transports automobiles (France) :

Tartary, administrateur-délégué des chemins de fer départementaux de l'Aube ;

✱ G. **Bouton**, vice-président, administrateur-délégué de la Compagnie des tramways de l'Est parisien ;

A. **Bussy**, président du Conseil d'administration de la Compagnie des omnibus et tramways de Lyon.

Chopin, directeur de la Régie départementale des chemins de fer départementaux de la Côte-d'Or.

✱ L. **Jeancard**, administrateur des chemins de fer économiques des Charentes.

Alphabetical index of delegates present at the session, indicating the sections they attented.

Number.	NAME.	DELEGATED BY	SECTIONS.
664	Aalborg (G. A.)	Chemins de fer de l'Etat (Denmark) .	3, 5
560	Abranches (J. J.)	Chemins de fer portugais de la Beira Alta (Portugal)	1. 2, 3
999	Acacio (J. M.)	Spanish Local Organising Committee .	—
670	Agerskov	Chemins de fer de Lolland-Falster (Denmark)	—
301	Airas (W. V.)	Chemins de fer de l'Etat (Finland) . .	2, 4, 5
277	Alarcon (P. P. de)	Chemins de fer du Nord de l'Espagne (Spain)	3, 4
265	Albuquerque (A.)	Chemins de fer Andalous (Spain) . .	4
946	Alcaraz (E.)	Spanish Local Organising Committee .	—
242	Allard (A.)	Société Nationale belge des Chemins de fer Vicinaux (Belgium)	5
682	Allen (P.)	Pennsylvania Railroad (U. S. A.) . .	1
84	Alonso Martinez (Marquis de)	Spanish Local Organising Committee .	2, 3, 4
96	Alonso-Zabala (M.) . . .	Spanish Local Organising Committee.	1, 5
8	Alstrup (T. A.)	Permanent Commission of the Association and Chemins de fer de l'Etat (Denmark)	4
692	Anderson (J. E.)	London, Midland and Scottish Railway (Great Britain)	1, 2, 3
672	Andre (Sr. D. R.)	Chemins de fer de Madrid à Saragosse et à Alicante (Spain)	—
398	Andriveau (A.)	Tramways de l'Indre (France)	2, 4, 5
533	Anghileri (Ch.)	Chemin de fer de l'Apennin central (Italy)	2, 3, 5
933	Arellano (P.)	Spanish Local Organising Committee .	—
76	Arrillaga (M. M.)	Permanent Commission of the Association (Spanish Section)	1, 3, 4
73	Arteaga (J.), duc del Infantado	Permanent Commission of the Association (Spanish Section) and Compagnie des Chemins de fer Andalous (Spain).	4
104	Artigas (J. A. de)	Spanish Local Organising Committee .	2, 3, 4
928	Ashworth (D. W.)	Permanent Commission of the Association (Section secretary)	3
318	Aubry (Ch.)	Chemins de fer d'Alsace et de Lorraine (France)	1, 4
377	Auriol (M.)	Société Générale des Chemins de fer Economiques (France)	4, 5
336	Bachellery	Chemin de fer du Midi (France) . . .	2
354	Baillargues (J.)	Chemin de fer de Paris à Orléans (France)	3

Number.	NAME.	DELEGATED BY	SECTIONS.
229	Bailloud (C.)	Chemins de fer de la Province de Santa Fé (Argentine)	1, 2. 5
681	Ball (A. J.)	Pennsylvania Railroad (U. S. A.)	4
694	Ballantyne (J.)	London, Midland & Scottish Railway (Great Britain)	3, 4
351	Balling	Chemins de fer de Paris à Orléans (France)	1
132	Bals (Th.)	Chemins de fer de l'Etat (Rumania)	2, 4, 5
874	Banchong (P. S.)	Ministère des voies de communication (Siam)	1, 3
948	Barcala (J.)	Spanish Local Organising Committee.	1, 4
70	Barcelo (J.)	Permanent Commission of the Association (Spanish Section)	1, 3, 4
642	Bärnheim (O.)	Union des Chemins de fer privés suédois (Sweden)	1, 3
675	Baron (D. F.)	Chemins de fer de Madrid-Saragosse-Alicante (Spain)	—
695	Barrett (A. W.)	London, Midland & Scottish Railway (Great Britain)	3, 4, 5
310	Barrier (R.)	Chemin de fer de l'Etat (France)	2, 3, 4
183	Barth	Chemin de fer de l'Est (France)	2, 3, 4
998	Bas (F. C.)	Spanish Local Organising Committee	—
281	Baselga y Ramirez (D. S.)	Mines et chemins de fer de Utrillas (Spain)	4, 5
565	Bastos (C.)	Compagnie des chemins de fer portugais (Portugal)	3
72	Baüer (A.)	Permanent Commission of the Association (Spanish Section)	4
314	Bauer (H.)	Chemins de fer d'Alsace et de Lorraine (France)	1, 3, 4
203	Baumann (H.)	Deutsche Reichsbahn Gesellschaft (Germany)	2
841	Baynoa (G. B.), Comte de	Ministère du Fomento (Spain)	—
1000	Becerra (M.)	Spanish Local Organising Committee	—
254	Beck (L.)	Chemins de fer de l'Est brésilien (Brazil)	5
371	Beghin (M.)	Chemins de fer Départementaux (France)	3
193	Beghin (P.)	Chemins de fer Départementaux (France)	5
905	Belluzzo (Son Exc.)	Ministère des Travaux publics (Italy)	2, 3, 4
148	Belmonte (L.)	Chemins de fer de l'Etat (Italy)	1, 3, 4
230	Bénac (G.)	Chemins de fer de la Province de Santa Fé (Argentine)	3, 4
528	Benedetti (A. de)	Chemin de fer du Nord de Milan (Italy)	1, 4, 5
624	Bener (P.)	Chemin de fer Rhétique (Switzerland)	1, 2, 3, 4, 5
589	Bengtzon	Chemin de fer de Bergslagen (Sweden)	2
82	Benicarlo (Marquis de)	Spanish Local Organising Committee	1, 3, 4
840	Benjumea y Burin (S.)	Ministère du Fomento (Spain)	1, 2, 3
495	Bennet Moore	Eastern Bengal Railway (India)	4
855	Benoist	Ministère des travaux publics (France)	3
746	Berkiewicz (J.)	Chemins de fer de l'Etat (Poland)	1, 2, 3
623	Bernasconi (E.)	Chemin de fer Rhétique (Switzerland)	1, 2, 3, 4, 5
740	Berner (O.)	Chemins de fer de l'Etat (Norway)	1, 3, 4
376	Berthelier (F.)	Société Générale de Chemins de fer économiques (France)	4, 5
333	Berveiller	Chemins de fer du Midi (France)	4

Number.	NAME.	DELEGATED BY	SECTIONS.
11	Besser (F.)	Permanent Commission of the Association and Reichsverkehrsministerium (Germany)	1, 2, 3
382	Best (H.)	Chemins de fer Economiques du Nord (France)	2, 3, 5
644	Beyaert (P.)	Railways économiques de Liége-Seraing et extensions and Tramways à vapeur Sud-néerlandais	3, 5
139	Bianchi (G.)	Chemins de fer de l'Etat (Italy)	1, 2
745	Bieniecki (W.)	Chemins de fer de l'Etat (Poland)	1, 3, 4
184	Biggs (Sir Ashley)	Office of the Under Secretary of State for India	1, 4, 5
465	Bindley (H. D.)	Sudan Government Railways and Steamers	1, 5
819	Biraghi (P.)	Confederazione Nazionale Fascista dei Trasporti terrestri e della navigazione interna (Italy)	—
796	Biscoe (W. T.)	North Western Railway (India)	2, 3, 4
421	Blanche (P.)	Chemin de fer de Damas-Hamah et prolongements (Asia Minor)	2
178	Bloch	Chemin de fer de Paris à Orléans (France)	2, 4
94	Boag (G. L.)	Spanish Local Organising Commission and Great Southern of Spain Railways.	3, 4
702	Bobby (A. S.)	Ceylon Government Railways	2
546	Boglione (C.)	Société Turinoise de tramways et de chemins de fer économiques (Italy)	1, 2, 5
959	Bognerin (D. R.)	Spanish Local Organising Committee.	1, 3, 4
71	Boix (F.)	Permanent Commission of the Association (Spanish Section)	1, 2, 3, 4, 5
791	Bond (F. S.)	North Western Railway (India)	1, 4, 5
506	Bottomley (J. E.)	Great Indian Peninsula Railway	2, 4, 5
327	Bouché-Leclercq (P.)	Chemin de fer de l'Est (France)	1, 3
231	Bouju (P.)	Chemins de fer de la province de Santa Fé (Argentine)	3, 4
308	Boulongne (de)	Chemin de fer de Paris à Lyon et à la Méditerranée (France)	1, 2
975	Bourrel	Société des Transports en Commun de la Région parisienne (France)	—
391	Bouteau (M.)	Compagnie Générale des Chemins de fer vicinaux (France)	5
338	Bouteloup	Chemin de fer du Midi (France)	1
771	Bouton (G.)	Union des voies ferrées et des transports automobiles (France)	1, 4, 5
863	Bouyoukas (G. P.)	Ministère des Communications (Greece).	3
361	Boyaux	Chemin de fer de Paris à Lyon et à la Méditerranée (France)	3, 4
60	Braem (A.)	Permanent Commission of the Association (Office of the Executive Committee)	—
483	Brereton (R. A.)	Burma Railways (India)	3, 4, 5
488	Brewith (Ch. P.)	Burma Railways (India)	3, 4, 5
842	Brioso Raggio (T.)	Ministère du Fomento (Spain)	—
784	Brouillet (R.)	Chemin de fer franco-éthiopien de Djibouti à Addis-Abeba	1, 4, 5

Number.	NAME.	DELEGATED BY	SECTIONS.
902	Brown (Sir G. McLaren . .	Canadian Pacific Railway	—
413	Brugère (J.)	Compagnie Fermière des Chemins de fer tunisiens (Tunis)	4
174	Bruneau	Chemin de fer du Midi (France) . . .	3, 4
741	Buch (H.)	Chemins de fer de l'Etat (Norway) . .	2
832	Buchwald (Ch.)	Ministère des Travaux publics (Denmark)	—
267	Buitrago (J. Martin) . . .	Chemins de fer Andalous (Spain) . . .	1
442	Bulleid (O. V.)	London & North Eastern Railway (Great Britain)	2, 4, 5
861	Buovolo	Direction générale des travaux publics (Tunis)	1, 2, 3
823	Burch (H. F.)	Delaware & Hudson Railroad (U. S. A.)	—
696	Burgoyne (S. T.)	Cheshire Lines Committee (Great-Britain)	3, 4, 5
703	Burt (Sir H.)	Bengal & North Western Railway (India)	3, 4, 5
924	Bury (R. E.)	East Indian Railway (India)	—
657	Buttle (D.)	Nitrate Railway (Chile)	1, 2, 3, 4
472	Byrde (E. A.)	Bengal Nagpur Railway (India) . . .	1, 2, 5
149	Byrom (C. R.)	London Midland & Scottish Railway (Great Britain)	3, 4
716	Cairnes (Lt. Col. T. A. F.).	Great Southern Railways (Ireland) . .	—
113	Cambournac	Chemin de fer du Nord (France) . . .	1, 3, 4
83	Campo (M. del)	Spanish Local Organising Committee)	1, 3, 5
985	Canthal (F.)	Spanish Local Organising Committee)	1, 5
803	Cardon	Chemin de fer de Paris à Orléans (France)	2
435	Carpmael (R.)	Great Western Railway (Great Britain)	1
969	Carr (G. R.)	Department of State (U. S. A.) . . .	2
492	Case (R. C.)	Eastern Bengal Railway (India) . . .	—
769	Caspers (V. C.)	Compagnie auxiliaire internationale de chemins de fer	2
845	Castellón y Ortega (F.) . .	Ministère du Fomento (Spain) . . .	1, 3, 4
13	Castiau (J.)	Permanent Commission of the Association and Ministère des Transports (Belgium)	1
180	Canovas del Castillo . . .	Chemins de fer Madrid-Saragosse-Alicante (Spain)	—
956	Cavestany (A.)	Spanish Local Organising Committee .	4
273	Caviedes (Marquis de) . .	Chemin de fer du Nord de l'Espagne . .	2, 3
980	Cawley (F.)	Government of the Irish Free State . .	—
4	Cecil (The Right Hon. Sir Evelyn).	Permanent Commission of the Association and Southern Railway (Great Britain)	3, 4
92	Cepeda (L.)	Spanish Local Organising Committee .	2, 3, 4
945	Cerrolaza (A.)	Spanish Local Organising Committee . .	—
64	Chantrell	Permanent Commission of the Association (Principal secretary)	—
962	Chaperon	Permanent Commission of the Association (Section secretary)	3
255	Checacci (G.)	Chemin de fer de l'Est Brésilien (Brazil)	3
423	Chenut (L.)	Chemin de fer Smyrne-Cassaba et prolongement and Chemin de fer Damas-Hamah et prolongements (Asia Minor)	3, 5

Number.	NAME.	DELEGATED BY	SECTIONS.
954	Chicheri (J. L.)	Spanish Local Organising Committee	—
287	Chisholm (W. H.)	Illinois Central Railroad (U. S. A.)	—
575	Chreplovitch (D.)	Chemins de fer de l'Etat (Jugoslavia)	1, 5
678	Clement (M. W.)	Pennsylvania Railroad (U. S. A.)	4
780	Clougher (N.)	Canadian National Railways	—
549	Colbert (F.)	Chemin de fer Guillaume-Luxembourg (Luxemburg)	1, 3
901	Coleman (D. C.)	Canadian Pacific Railway	1
854	Collin	Ministère des travaux publics (France)	2, 3
343	Collin (G.)	Chemin de fer du Nord (France)	2, 3, 4
2	Colson (C.)	Permanent Commission of the Association and Ministère des Travaux publics (France)	—
228	Comble (J.)	Chemin de fer de Rosario à Puerto Belgrano (Argentine)	3, 4
700	Cooper (A. G.)	Ceylon Government Railways	1, 5
433	Cope (R.)	Great Western Railway (Great-Britain)	4
929	Corner	Permanent Commission of the Association (Section secretary)	5
982	Coronas (A.)	Ferrocarriles Economicos de Asturias (Spain)	—
691	Cortez-Leigh (F. A.)	London Midland & Scottish Railway (Great Britain)	1, 2, 4
126	Cossart (L.)	Chemin de fer du Nord (France)	1, 2, 5
619	Cottier (Dr.)	Chemins de fer fédéraux (Switzerland)	4
339	Couillié	Chemin de fer du Midi (France)	1
873	Couvreur (R. da Costa)	Ministère du Commerce et des Communications (Portugal)	—
894	Cramp (C. T.)	Ministry of Transport (Great Britain)	4
393	Crépin (G.)	Compagnie Générale de voies ferrées d'intérêt local (France)	1, 4, 5
908	Crispo	Ministère des communications (Italy)	5
782	Crombé (G.)	Compagnie Générale d'entreprises électriques et industrielles « Electrobel » (Belgium)	—
482	Crosthwaite (B. M.)	Burma Railways (India)	3, 4, 5
722	Cuttica (A.)	Chemins de fer de l'Etat (Italy)	2
867	Czapski (W.)	Ministère des Chemins de fer (Poland)	1, 3, 4
586	Dahlbeck (G.)	Chemins de fer de l'Etat (Sweden)	1, 3, 4
141	Dähnick (E.)	Deutsche Reichsbahn Gesellschaft (Germany)	2
257	Dantschoff (J.)	Chemins de fer de l'Etat (Bulgaria)	1, 3, 5
409	Dargeon	Chemins de fer Algériens de la Compagnie Paris-Lyon-Méditerranée (Algiers)	3, 4
414	Dattée (F.)	Compagnie fermière des Chemins de fer Tunisiens (Tunis)	2, 4
15	Dautry	Permanent Commission of the Association and Chemins de fer de l'Etat (France)	2, 3, 4
432	Davis (F. R. E.)	Great Western Railway (Great Britain)	1, 2, 3, 4, 5
235	Debarsy (H.)	Société Nationale des Chemins de fer vicinaux (Belgium)	5
416	Debize (R.)	Compagnie fermière des Chemins de fer Tunisiens (Tunis)	1, 2
238	De Bruyne (A.)	Société Nationale des Chemins de fer vicinaux (Belgium)	5

Number.	NAME.	DELEGATED BY	SECTIONS.
827	**De Droog** (H.)	Ministère des transports (Belgium)	—
169	**Dégardin**	Chemin de fer de Paris à Orléans (France)	3, 4, 5
100	**Delatte** (E.)	Spanish Local Organising Committee	1, 2, 3, 4, 5
379	**Delille** (A.)	Société Générale de Chemins de fer économiques (France)	1, 2
881	**De Marre** (O.)	Société Nationale des Chemins de fer belges (Belgium)	3
707	**Dennis** (R. H.)	Bengal & North Western Railway (India)	1, 5
16	**Dent** (Sir Francis)	Permanent Commission of the Association and Southern Railway (Great Britain)	1, 3, 4
241	**Desmedt** (G.)	Société Nationale des Chemins de fer vicinaux (Belgium)	5
62	**Desprets** (R.)	Permanent Commission of the Association	1
799	**Dias (Prata)**	Port et Chemins de fer de Lourenço-Marques (Portuguese East Africa)	3, 4, 5
647	**Dickson** (N. B.)	Great Western of Brazil Railway	1, 2
568	**Diniz** (C. J.)	Compagnie Nationale des Chemins de fer portugais (Portugal)	—
567	**Diniz** (P. J.)	Compagnie Nationale des Chemins de fer portugais (Portugal)	3, 4, 5
305	**Direz** (A.)	Chemins de fer de l'Etat (France)	3, 4, 5
17	**Djouritchitch** (B.)	Permanent Commission of the Association (Ministère des communications) (Jugoslavia)	3, 4
677	**D'Ocon** (E.)	Chemins de fer Madrid-Saragosse-Alicante (Spain)	4
665	**Dorph** (H. G.)	Chemins de fer de l'Etat (Denmark)	3, 5
18	**Dorpmüller**	Permanent Commission of the Association and Deutsche Reichsbahn Gesellschaft) (Germany)	1, 2, 3, 4, 5
313	**Dreyfuss** (J.)	Chemins de fer de l'Etat (France)	1, 3, 4
119	**Driessen** (Ch. H. J.)	Chemins de fer néerlandais (Netherlands)	1, 3, 4
356	**Dubois** (A.)	Chemin de fer de Paris à Orléans (France)	1
328	**Duchatel** (E.)	Chemin de fer de l'Est (France)	2, 3
509	**Dundas-Couchman** (Sir Francis).	Madras & Southern Mahratta Railway (India)	1, 5
411	**Durandeau** (L.)	Compagnie des Phosphates et du Chemin de fer de Gafsa (Tunis)	1, 2, 3
175	**d'Welles (Boistel)**	Compagnie du Chemin de fer de Paris à Orléans (France)	1. 3, 4
673	**Echeverria** (F.)	Chemin de fer de Madrid à Saragosse et à Alicante (Spain)	—
606	**Ekholm** (H.)	Chemin de fer de Stockholm-Roslag (Sweden)	1, 5
650	**Ellis** (F. O.)	Great Western of Brazil Railway	1, 2, 5
355	**Epinay** (C.)	Chemin de fer de Paris à Orléans (France)	2
278	**Escolar** (C.)	Chemin du Nord de l'Espagne (Spain)	1, 4
97	**Escoriaza** (Vizconde de)	Spanish Local Organising Committee	4, 5
952	**Escoriaza** (E.)	Spanish Local Organising Committee	—

Number.	NAME.	DELEGATED BY	SECTIONS.
282	**Escoriaza** (J. M.)	Compagnie nationale des chemins de fer de l'Ouest de l'Espagne (Spain)	4, 5
934	**Eulate** (J.)	Permanent Commission of the Association (Section secretary)	2
793	**Everall** (W. T.)	North Western Railway (India)	1
295	**Ewing** (Ch. H.)	Reading Company (U. S. A.)	1, 3. 4
19	**Fabris** (A.)	Permanent Commission of the Association, and Chemins de fer de l'Etat (Italy)	1, 2, 5
321	**Fabry** (R.)	Chemin de fer de l'Est (France)	3, 4
542	**Failla** (M.)	Gestione Governativa delle Forrovie Salentine (Italy)	2
723	**Falcone** (G.)	Chemins de fer de l'Etat (Italy)	4, 5
68	**Faquineto** (A.)	Permanent Commission of the Association (Spanish Section)	3, 4, 5
152	**Farenc**	Chemins de fer du Midi (France)	3, 4, 5
147	**Farné**	Chemins de fer de l'Etat (Italy)	—
118	**Fava** (A.)	Chemins de fer de l'Etat (Italy)	—
684	**Favier**	Chemins de fer coloniaux (Indo-China)	1, 4, 5
207	**Fay** (Sir S.)	Buenos-Ayres Great Southern Railway (Argentine)	2, 3, 4
821	**Ferrario** (A.)	Confederazione Nazionale Fascista dei Trasporti terrestri e della Navigazione interna (Italy)	—
564	**Ferreira** (A. V.)	Compagnie des Chemins de fer portugais (Portugal)	1, 3, 4
755	**Ferreira Torrès** (C. M.)	Administration des Chemins de fer de l'Etat dans les colonies portugaises (Portugal)	3, 4, 5
153	**Fiala** (C.)	Ministère des Chemins de fer (Czechoslovakia)	3
261	**Finnis** (D. R.)	Taltal Railway (Chile)	2, 4
20	**Fiori** (F.)	Permanent Commission of the Association. Chemins de fer de l'Etat (Italy)	1, 3, 4
662	**Flensborg** (H.)	Chemins de fer de l'Etat (Denmark)	1, 4
279	**Flobert** (A.)	Chemins de fer du Nord de l'Espagne (Spain)	2, 3, 4
689	**Follows** (J. H.)	London, Midland & Scottish Railway (Great Britain)	1, 2, 3, 4, 5
21	**Fontaneilles** (M.)	Permanent Commission of the Association	4, 5
514	**Forbes** (H.)	County Donegal Railways, Joint Committee (Ireland)	1, 4, 5
434	**Ford**	Great Western Railway (Great Britain)	2, 3, 4
594	**Forssman** (A.)	Göteborg-Boras & Boras Alfvesta Railway (Sweden)	1, 3
862	**Forster**	New South Wales Government	—
768	**Forster** (H. J.)	American Railway Association	1, 2, 3
1	**Foulon** (E.)	Permanent Commission of the Association, and Société Nationale des Chemins de fer belges (Belgium)	—
499	**Fowle** (F. W. C.)	Great Indian Peninsula Railway	1, 5
22	**Fowler** (Sir Henry)	Permanent Commission of the Association and London Midland & Scottish Railway (Great Britain)	—
219	**Fox** (J. R. S.)	Central Argentine Railway	1

Number.	NAME.	DELEGATED BY	SECTIONS.
145	Fraile (P.)	Chemins de fer du Nord de l'Espagne (Spain)	2
23	Frank (A.)	Permanent Commission of the Association and Ministère des Chemins de fer (Poland)	2, 3, 4
316	Frant (Ch.)	Chemins de fer d'Alsace et de Lorraine (France)	3, 4
439	Fraser (W. A.)	London & North Eastern Railway (Great Britain)	1, 3
353	Frédault (F.)	Chemin de fer de Paris à Orléans (France)	1 to 5
609	Friesen (E. O. von)	Chemins de fer de Uppsala-Norrland (Sweden)	1. 2. 5
660	Fujino (K.)	South Manchuria Railway (China)	1
164	Gaeremynck (O. A.)	Société Nationale des chemins de fer belges (Belgium)	3, 4
195	Gage (R. G.)	Canadian National Railways	2, 4, 5
173	Gaier (Th.)	Deutsche Reichsbahn Gesellschaft (Germany)	4
646	Gaillard (G.)	Compagnie du Chemin de fer du Congo (Belgian Congo)	5
334	Garau	Chemin de fer du Midi (France)	—
78	Garcia-Lomas (J. M.)	Permanent Commission of the Association (Spanish Section)	1. 2, 3. 4. 5
144	Garcia-Varo (M.)	Chemins de fer Andalous (Spain)	—
275	Garre (E.)	Chemins de fer du Nord de l'Espagne (Spain)	3, 4, 5
67	Gaytán de Ayala (J.)	Permanent Commission of the Association (Spanish Section)	1. 2, 3, 4, 5
236	Gevaert (E.)	Société Nationale des Chemins de fer vicinaux (Belgium)	5
237	Gheude (C.)	Société Nationale des Chemins de fer vicinaux (Belgium)	5
24	Ghilain (P.)	Permanent Commission of the Association	—
537	Giacomo (M.)	Chemins de fer complémentaires de la Sardaigne (Italy)	4
157	Gibert (A.)	Chemins de fer Madrid-Saragosse-Alicante (Spain)	2, 3
443	Gibson (A. L.)	London & North Eastern Railway (Great Britain)	3, 4
853	Gilles-Cardin	Ministère des Travaux publics (France)	3, 4
90	Gimenez Lombardo (M.)	Spanish Local Organising Committee and Chemins de fer Andalous (Spain).	—
540	Giovanola (P.)	Chemins de fer du Tessin and Confederazione Nazionale Facista dei Trasporti terrestri e della Navigazione interna (Italy)	1, 3, 5
732	Giovene (N.)	Chemins de fer de l'Etat (Italy)	1, 3, 4
322	Girod de l'Ain (M.)	Chemins de fer de l'Etat (France)	3, 4
518	Glover (G. T.)	Great Northern Railway (Ireland)	2, 5
419	Godfernaux (R.)	Chemin de fer de Dakar à Saint-Louis (Africa)	1, 2, 3, 4, 5
834	Gomez-Diaz (A.)	Ministère du Fomento (Spain)	1, 2, 3
756	Gonçalves (J. T.)	Chemins de fer de l'Etat dans les colonies portugaises (Portugal)	2
99	Gonzalez (A.)	Spanish Local Organising Committee	—

Number.	NAME.	DELEGATED BY	SECTIONS.
103	Gonzalez (J. M.)	Spanish Local Organising Committee	—
953	González Valerio (J.)	Spanish Local Organising Committee	—
42	Gordini	Chemins de fer de l'Etat (Italy)	—
798	Gordon (Major R. E.)	North Western Railway (India)	1
150	Gottschalk (Dr. Ing. F.)	Deutsche Reichsbahn Gesellschaft (Germany)	3
705	Gracey (Lt. Col. Th.)	Bengal & North Western Railway (India)	1, 4
839	Granda y Callejo (J. de)	Ministère du Fomento (Spain)	—
274	Grasset (H.)	Chemins de fer du Nord de l'Espagne (Spain)	1, 2, 3
976	Gray (A. W.)	London Midland & Scottish Railway (Great Britain)	—
757	Greger (N.)	Chemins de fer Kristianstad-Hässleholm (Sweden)	3
129	Gresley (H. N.)	London & North Eastern Railway (Great Britain)	1, 2, 3
211	Grey (N. F. E.)	Buenos Ayres Great Southern Railway (Argentine)	3, 4, 5
794	Griffin (A. C.)	North Western Railway (India)	1, 5
27	Grimpret	Permanent Commission of the Association and Ministère des travaux publics (France)	—
971	Grouse (L. M.)	New South Wales Government Railways	1, 2, 4
614	Grüber	Chemins de fer fédéraux (Switzerland)	1, 3, 4
300	Gruner (S. A. S.)	Chemins de fer de l'Etat (Finland)	1, 3, 4
323	Gruson (P.)	Chemins de fer de l'Est (France)	3, 4
199	Guadalhorce (le Comte de)	Former Minister of the Fomento (Spain)	—
258	Guenkoff (S.)	Chemins de fer de l'Etat (Bulgaria)	2, 5
805	Guerin (A.)	Compagnie des Chemins de fer du Maroc (Morocco)	4
385	Gufflet	Voies ferrées des Landes (France)	3, 4, 5
381	Guillaume (B.)	Chemins de fer Economiques du Nord (France)	2, 3, 5
986	Guzman Donoso (C.)	Chilean Government	—
912	Haas (F. de)	Permanent Commission of the Association (Advertising department)	—
61	Habran (J.)	Permanent Commission of the Association	4
394	Hagneaux (A.)	Compagnie Générale des Voies ferrées d'intérêt local (France)	2, 3, 5
337	Hallard	Chemins de fer du Midi (France)	2
610	Hallberg (Dr. J.)	Chemin de fer de Uppsala-Norrland (Sweden)	3, 4
910	Hamada (Effendi Abdel Rahman)	Chemins de fer l'Etat (Egypt)	2. 4, 5
914	Hamel (H.)	Deutsche Reichsbahn Gesellschaft (Germany)	—
680	Hankins (F. W.)	Pennsylvania Railroad (U. S. A.)	2
296	Hare (J. V.)	Reading Company (U. S. A.)	4
649	Harper (H.)	Great Western of Brazil Railway	3, 4
690	Hartley (Sir H.)	London, Midland and Scottish Railway (Great Britain)	1, 2, 3, 4, 5
28	Harvey (R. J.)	Permanent Commission of the Association and Government of New-Zealand	1, 2, 3, 4, 5
826	Hein (Dr. G.)	Reichsverkehrsministerium (Germany)	4
303	Helbronner (J.)	Chemins de fer de l'Etat (France)	2, 3, 4

Number.	NAME.	DELEGATED BY	SECTIONS.
201	**Hellenthal** (H.)	Deutsche Reichsbahn Gesellschaft (Germany)	1
463	**Henderson** (D.)	Sudan Government Railways and Steamers	1, 4, 5
764	**Hendrich** (O.)	Chemins de fer de l'Etat (Czechoslovakia)	2
882	**Hennig** (E.)	Société Nationale des Chemins de fer belges (Belgium)	5
326	**Henry** (A.)	Chemins de fer de l'Est (France)	1, 3
352	**Henry-Gréard** (A.)	Permanent Commission of the Association and Chemins de fer de Paris à Orléans (France)	—
81	**Hernandez Bayarri** (A.)	Spanish Local Organising Committee	1, 3
620	**Herold**	Chemins de fer fédéraux (Switzerland)	3, 4
866	**Heuff** (A. M.)	Ministère du Waterstaat (Netherlands)	3
350	**Heurteau** (Ch. E.)	Chemin de fer de Paris à Orléans (France)	1, 2, 3, 4, 5
628	**Higgins** (W.)	Central Uruguay Railway of Montevideo (Uruguay)	3, 4
452	**Higham** (R.)	Gold Coast Government Railways	3, 4, 5
601	**Hildebrand** (E.)	Chemin de fer Nora-Bergslagen (Sweden)	1, 3, 4
466	**Hills** (A. J.)	Canadian National Railways	—
807	**Hinglais** (E.)	Compagnie des Chemins de fer du Maroc (Morocco)	2
666	**Hiort-Lorenzen** (H. R. P.)	Chemins de fer de l'Etat (Denmark)	1
500	**Hitchcock** (R. V.)	Great Indian Peninsula Railway	1, 4, 5
552	**Hoekstra** (H. E.)	Chemins de fer néerlandais (Netherlands)	2, 3, 4
591	**Holmgren** (I.)	Chemin de fer Blekinge Kustbanor (Sweden)	3
521	**Holt** (A. L.)	Iraq State Railways (Mesopotamia)	1, 3, 4
762	**Hondl** (J.)	Chemin de fer de l'Etat (Czechoslovakia)	4
204	**Honold** (R.)	Deutsche Reichsbahn Gesellschaft (Germany)	4
501	**Hood** (W.)	Great Indian Peninsula Railway	1
471	**Hughes** (F. S.)	Bengal Nagpur Railway (India)	1, 2, 5
30	**Hunziker** (H.)	Permanent Commission of the Association and Département fédéral des Postes et des Chemins de fer (Switzerland)	1, 3, 4
31	**Hurcomb** (Sir Cyril)	Permanent Commission of the Association and Ministry of Transport (Great Britain)	3, 4, 5
667	**Hyllestad** (E.)	Chemins de fer de l'Etat (Danemark)	3, 4
812	**Ikegami** (S.)	Japanese Government Railways	2, 3
837	**Iribarren** (F.)	Ministère du Fomento (Spain)	—
913	**Ittersum** (Baron van)	Permanent Commission of the Association (Advertising department)	—
706	**Izat** (Lt.-Col. W. R.)	Bengal & North Western Railway (India)	1, 3, 4
548	**Jac** (F.)	Chemin de fer Guillaume-Luxembourg (Luxemburg)	4
271	**Jacob** (N.)	Chemin de fer Central de Aragon (Spain)	2, 3, 4
581	**Jacobi** (G.)	Chemins de fer de l'Etat (Sweden)	4
240	**Jacobs** (L.)	Société Nationale des Chemins de fer vicinaux (Belgium)	5
898	**Jacobs** (T. W.)	Baltimore & Ohio Railroad (U. S. A.)	—

Number.	NAME.	DELEGATED BY	SECTIONS.
32	Jacques (A.)	Permanent Commission of the Association and Société Nationale des Chemins de fer belges (Belgium)	1
858	Jacquet	Ministère des Travaux publics (France)	4
428	Jacquinot (P.)	Chemin de fer du Port et de la Pointe des Galets (Reunion Island)	2, 4, 5
244	Jadot (L.)	Chemin de fer du Bas-Congo au Katanga (Belgian Congo)	2, 3, 5
857	Janet	Ministère des Travaux publics (France)	4
363	Japiot	Chemins de fer de Paris à Lyon et à la Méditerranée (France)	2, 4
5	Javary (P. E.)	Permanent Commission of the Association and Chemin de fer du Nord (France)	—
774	Jeancard (L.)	Union des Voies Ferrées et des Transports Automobiles (France)	3, 4, 5
761	Jeanneret (E.)	Chemin de fer d'Yverdon à Ste-Croix (Switzerland)	2, 3, 5
831	Jensen (C. V.)	Ministère des Travaux publics (Denmark)	2, 4
751	Jezierski (H.)	Chemins de fer de l'Etat (Poland)	1, 2, 3
604	Johnson (H. O.)	Chemin de fer Oxelösund-Flen Västmanlands (Sweden)	1, 2, 5
603	Johnson (J.)	Chemin de fer Oxelösund-Flen-Västmanlands (Sweden)	3, 4
802	Jönsson (C.)	Chemin de fer de Nassjö-Oskarshamm (Sweden)	4
491	Joscelyne (H. A.)	Eastern Bengal Railway (India)	1
186	Jourdain (P.)	Chemins de fer secondaires du Nord-Est (France)	3, 4, 5
108	Jullien	Chemin de fer de Paris à Orléans (France)	1, 2, 3
390	Just (A.)	Chemins de fer de la Provence (France)	5
865	Jynge (A.)	Ministère des travaux publics (Norway)	—
608	Kamph (A.)	Chemin de fer de Stockholm-Vesteras-Bergslagen (Sweden)	3, 4, 5
189	El Kattan (Mostafa Hamdy Bey)	Ministère des Communications and Chemins de fer de l'Etat (Egypt)	1, 3, 5
437	Kay (J. A.)	Great Western Railway (Great Britain)	1, 2, 3, 4, 5
808	Kihara (Y.)	Japanese Government Railways	1
884	Killik (Sir Stephen)	Colombia Railways & Navigation Company (Colombia)	—
926	King-Stephens (H. C.)	Permanent Commission of the Association (Section secretary)	1
893	Kirkus (A. E.)	Ministry of Transport (Great Britain)	3, 4, 5
816	Kobinata (E.)	Japanese Government Railways	4, 5
127	Koller (P.)	Chemins de fer de l'Etat and Ministère des Chemins de fer (Czechoslovakia)	—
717	Koronis (S.)	Chemins de fer de l'Etat (Greece)	3, 4
814	Kozai (Y.)	Japanese Government Railways	3, 5
77	Krahe (A.)	Permanent Commission of the Association (Spanish Section)	1, 2, 3, 4, 5
110	Krick (E.)	Chemins de fer de l'Etat (Jugoslavia)	1
159	Kristensen (J.)	Chemins de fer de l'Etat (Denmark)	3
615	Labhardt	Chemins de fer fédéraux (Switzerland)	3, 4

Number.	NAME.	DELEGATED BY	SECTIONS.
843	Lacasa y Navarro (T.)	Ministère du Fomento (Spain)	1, 4
270	Lagasse (O.)	Chemins de fer Catalans (Spain)	1, 2, 5
3	Lamalle (U.)	Permanent Commission of the Association and Société Nationale des Chemins de fer belges (Belgium)	1, 2, 3, 4, 5
142	Lancrenon	Chemin de fer du Nord (France)	1, 2 3
724	Landra (Dr. A.)	Chemins de fer de l'Etat (Italy)	3, 4, 5
856	Lang	Ministère des travaux publics (France)	1
268	Lazarraga (E.)	Chemins de fer Andalous (Spain)	2
168	Le Besnerais	Chemin de fer du Nord (France)	2, 3, 4
138	Leboucher	Chemin de fer du Midi (France)	—
679	Le Boutillier (G.)	Pennsylvania Railroad (U. S. A.)	4
760	Leder (W.)	Chemin de fer de la Vallée de Birsig (Switzerland)	2, 4, 5
330	Legrand (Y.)	Chemin de fer de l'Est (France)	2, 3
163	Leibbrand (M.)	Deutsche Reichsbahn-Gesellschaft (Germany)	3
880	Lemaire	Société Nationale des Chemins de fer belges (Belgium)	1
140	Lemon (E. J. H.)	London Midland & Scottish Railway (Great Britain)	2
307	Lemonnier (A.)	Chemins de fer de l'Etat (France)	3, 4, 5
128	Lentz (W. L.)	New York Central Lines (U. S. A.)	2
345	Le Poittevin (A.)	Chemin de fer du Nord (France)	1, 2, 3
341	Leroy (M.)	Chemin de fer du Nord (France)	3, 4, 5
55	Lessen (H. J. van)	Chemin de fer néerlandais (Netherlands)	2, 3, 4
304	Levy (P.)	Chemins de fer de l'Etat (France)	1, 4
754	De Lima (A. A. Lisboa de)	Administration des Chemins de fer de l'Etat dans les Colonies portugaises (Portugal)	3, 4, 5
563	Lima Henriques (A. de)	Compagnie des Chemins de fer portugais (Portugal)	3, 4
602	Lindgren (E. M.)	Chemin de fer Norra-Ostergötland (Sweden)	1, 2, 3
527	Lissoni (E.)	Chemin de fer de la Méditerranée (Italy)	3, 4, 5
185	Lloyd Jones (C. W.)	Office of Under Secretary of State for India	5
545	Lo Balbo (P.)	Tramways à vapeur Piémontais (Italy)	5
329	Loizillon (J.)	Chemin de fer de l'Est (France)	2, 3
636	Loth (P.)	International Sleeping Car Company	2, 3, 4
406	Luuyt	Chemin de fer Paris-Lyons-Méditerranée (Algerian Lines)	1, 2, 3, 4
526	Luzzati (R.)	Chemin de fer de la Méditerranée (Italy)	1, 2, 3
291	Mac Bain (D. R.)	New-York Central Lines (U. S. A.)	3
838	Machimbarrena (V.)	Ministère du Fomento (Spain)	—
930	Mac Lellan (W.)	Permanent Commission of the Association (Section secretary)	—
710	Mac Mahon (The Right Hon. James)	Great Southern Railways (Ireland)	4
516	Madden (Lt. col. J. C. W.)	Great Northern Railway (Ireland)	1, 3, 4
810	Maeda (S.)	Japanese Government Railways	3, 4, 5
566	Malheiro (F.)	Compagnie des Chemins de fer portugais (Portugal)	2
395	Mallez (L.)	Régie Départementale des Tramways de l'Ain (France)	5

Number.	NAME.	DELEGATED BY	SECTIONS.
467	Mallory (E. P.)	Canadian National Railways	1, 3, 4
725	Maltese (S.)	Chemins de fer de l'Etat (Italy)	3, 4, 5
54	Manen (H. van)	Permanent Commission of the Association	3, 4
36	Mange (A.)	Permanent Commission of the Association	3, 4
645	Marchal (A.)	Compagnie du Chemin de fer du Congo (Belgian Congo)	5
37	Marchi (C.)	Permanent Commission of the Association and Confederazione Nazionale Fascista dei Trasporti terrestri e della Navigazione interna (Italy)	—
632	Margot (R.)	International Sleeping Car Company	2, 3, 4
34	Marguerat (A.)	Permanent Commission of the Association and Chemin de fer de Viège à Zermatt (Switzerland)	5
179	Marin del Campo (R.)	Chemins de fer Madrid-Saragosse-Alicante (Spain)	—
89	Maristany (G.)	Spanish Local Organising Committee	4
574	Markovitch (D.)	Chemin de fer de l'Etat (Jugoslavia)	4
944	Marrero (J. E.)	Spanish Local Organising Committee	—
511	Marsh (J. G.)	Madras & Southern Mahratta Railway (India)	3, 4, 5
906	Martelli (A.)	Ministère des Travaux publics (Italy)	3, 4, 5
357	Martin (G.)	Chemin de fer de Paris à Orléans (France)	2
824	Massereene & Ferrard (The Right Hon. Viscount)	London Midland & Scottish Railway, Northern Counties Committee (Ireland)	—
93	Masso (A.)	Spanish Local Organising Committee	1, 3, 4
198	Matos (Don P.)	Minister of the Fomento (Spain)	—
981	Matos (P.)	Ministry of the Fomento (Spain)	—
112	Matsunawa (S.)	Japanese Government Railways and Government General of Chosen	1, 2, 3
79	Mayandia (A.)	Spanish Local Organising Committee	4, 5
233	Mayer (R.)	Chemin de fer du Nord (Nord-belge Lines) (Belgium)	3, 4, 5
847	Mayoral (D.)	Ministère du Fomento (Spain)	2, 3, 5
719	Melissinos	Chemins de fer de l'Etat (Greece)	1, 3
187	Mellini (E.)	Permanent Commission of the Association (reporter)	3, 4, 5
121	Mendizabal (D.)	Permanent Commission of the Association (reporter)	1, 2, 4
626	Mercier (G.)	Chemins de fer de Lausanne à Ouchy (Switzerland)	3
40	Mereutza (C.)	Permanent Commission of the Association and Chemins de fer de l'Etat (Rumania)	3, 4, 5
726	Merucci (E.)	Chemins de fer de l'Etat (Italy)	4
920	Merz (A. S.)	Secretary of State (U. S. A.)	—
283	Messa (V.)	Chemins de fer de l'Ouest de l'Espagne (Spain)	1, 2, 3
571	Miclesco (J.)	Chemins de fer de l'Etat (Rumania)	3, 4, 5
396	Mielle (H.)	Régie Départementale des Tramways de l'Ain (France)	5

Number	NAME.	DELEGATED BY	SECTIONS.
547	**Migliau** (I.)	Tramways Vercellesi (Italy)	2, 3, 5
431	**Milne** (J.)	Great Western Railway (Great Britain)	1, 2, 3, 4, 5
63	**Minsart** (E.)	Permanent Commission of the Association	—
915	**Moniz Gordilho** (C. A.)	Ministère de l'Industrie, des Travaux Publics et des Communications (Brazil)	—
422	**Monod** (J. P.)	Chemin de fer de Smyrne-Cassaba et prolongement (Asia Minor)	3. 4
69	**Moralès** (L.)	Permanent Commission of the Association (Spanish Section)	1, 2, 3, 4, 5
940	**Morales Lahuerta** (C.)	Permanent Commission of the Association (Section secretary)	5
850	**Moreau-Néret**	Ministère des Travaux Publics (France)	3. 4, 5
75	**Moreno** (Comte de Fontao)	Permanent Commission of the Association (Spanish Section)	2, 3
936	**Moreno** (A.)	Permanent Commission of the Association (Section secretary)	3
984	**Moreno** (F.)	Spanish Local Organising Committee	—
900	**Morgan** (Sir Charles Langbridge)	Southern Railway (Great Britain)	—
661	**Morita** (S.)	South Manchuria Railway (China)	2
697	**Mosley** (H. V.)	Great Central & Midland Joint Committee (Great-Britain)	2, 3, 4
534	**Mossetto** (G. B.)	Chemin de fer Central et Tramways du Canavèse (Italy)	2, 3, 4
892	**Mount** (Lt. Col. A. H.)	Ministry of Transport (Great Britain)	1, 2, 3
344	**Moutier** (A.)	Chemin de fer du Nord (France)	1, 2, 3
922	**Muchnic** (Ch. H.)	Secretary of State (U. S. A.)	—
618	**Müller**	Chemins de fer fédéraux (Switzerland)	2, 3
120	**Müller** (Dr. Ing. O.)	Deutsche Reichsbahn Gesellschaft (Germany)	1
663	**Munck** (O. H.)	Chemin de fer de l'Etat (Denmark)	2, 3
715	**Murphy** (J. X.)	Great Southern Railways (Ireland)	—
607	**Murray** (W.)	Chemin de fer Stockholm Vesteras-Bergslagen (Sweden)	1, 2
815	**Nakahara** (J.)	Japanese Government Railways	1
659	**Nakamura** (H.)	South Manchuria Railway (China)	1, 2, 3
309	**Nasse** (J.)	Chemins de fer de l'Etat (France)	2, 3, 4
753	**Navarro** (E. J.)	Chemin de fer de l'Etat dans les colonies portugaises (Portugal)	4 5
464	**Neilson** (T.)	Kenya & Uganda Railway (Africa)	—
605	**Nerell** (A.)	Chemin de fer Stockholm-Roslag (Sweden)	2, 3, 4
292	**Neubert** (J. V.)	New York Central Lines (U. S. A.)	1
263	**Neumann** (S.)	Chemins de fer de la Fionie méridionale (Denmark)	3, 4, 5
693	**Newlands** (A.)	London Midland & Scottish Railway (Great Britain)	1, 4, 5
438	**Newton** (Ch. H.)	London & North Eastern Railway (Great Britain)	4
162	**Nicholls** (R. H.)	Great Western Railway (Great Britain)	3
949	**Nó** (V. de)	Spanish Local Organising Committee	3, 4
158	**Noguês** (J.)	Permanent Commission of the Association (reporter)	2, 3, 4
66	**Nollet** (E.)	Permanent Commission of the Association (Office of the Executive Committee)	2, 4

Number.	NAME.	DELEGATED BY	SECTIONS.
125	**Nordmann** (H.)	Deutsche Reichsbahn Gesellschaft (Germany)	2
587	**Norrby** (A.)	Chemin de fer de Bergslagen (Sweden)	3, 4, 5
709	**Nugent** (Sir Walter)	Great Southern Railway (Ireland)	1, 3, 4
848	**Nuñez Arenas** (A.)	Ministère du Fomento (Spain)	3, 4, 5
611	**Nyström** (Col. J.)	Chemin de fer Västergötland-Göteborg (Sweden)	1, 4, 5
582	**Öfverholm** (J.)	Chemins de fer de l'Etat (Sweden)	2
978	**Ohguimi** (Y.)	Japanese Government	1, 2, 3, 4, 5
88	**Olanda** (L.)	Spanish Local Organising Committee	1, 2, 3
583	**Olofsson** (C.)	Chemins de fer de l'Etat (Sweden)	3, 4
809	**Onoe** (S.)	Japanese Government Railways	2
968	**Ortmans**	Compagnie Nationale de Chemins de fer en Colombie (Colombia)	—
98	**Otamendi** (M.)	Spanish Local Organising Committee	3, 4
544	**Ottone** (G.)	Confederazione Nazionale Fascista dei Trasporti terrestri e della Navigazione interna (Italy)	2, 3, 5
977	**Ottone** (L.)	Société Nationale de Chemins de fer et Tramways (Italy)	2, 3, 5
763	**Ourednicek** (J.)	Chemins de fer de l'Etat (Czechoslovakia)	4, 5
315	**Pader** (G.)	Chemins de fer d'Alsace et de Lorraine (France)	3, 4
436	**Page** (C. S.)	Great Western Railway (Great Britain)	4
637	**Painter** (E. E.)	Railway Clearing House (Great Britain)	4
600	**Pallin** (K. A.)	Chemins de fer Karlstad-Munkfors-Nordmarks - Klarelfvens - Filipstads - Nora-Bergslagen (Sweden)	1, 2, 3
728	**Palmieri** (G. C.)	Chemins de fer de l'Etat (Italy)	1, 2, 3
218	**Pank**	Central Argentine Railway (Argentine)	2
909	**Panunzio**	Ministère des Travaux Publics (Italy)	—
260	**Parish** (W. W.)	Taltal Railway (Chile)	3, 4
131	**Parmantier**	Chemins de fer de Paris à Lyon et à la Méditerranée (France)	2, 4
266	**Pastor** (A.)	Chemins de fer Andalous (Spain)	3
114	**Patte** (G.)	Chemins de fer de l'Est (France)	1, 2, 3
43	**Paul** (J. R.)	Permanent Commission of the Association and Chemin de fer du Midi (France)	4
389	**Pauzat** (J.)	Chemin de fer de Somain à Anzin et à la frontière belge (France)	2, 3, 4
579	**Pavlovitch** (A.)	Chemin de fer de l'Etat (Jugoslavia)	3
729	**Pedemonti** (G.)	Chemins de fer de l'Etat (Italy)	2
151	**Pellarin**	Chemins de fer de l'Est (France)	1, 3, 4
410	**Pellé** (M.)	Compagnie des Phosphates et du Chemin de fer de Gafsa (Tunis)	1, 2, 5
541	**Perrone** (V.)	Gestione Governativa delle Ferrovie Salentine (Italy)	1
523	**Petridis** (J.)	Chemin de fer Pirée-Athènes-Péloponèse (Greece)	1, 3, 4
991	**Petrucci** (A.)	Confederazione Nazionale Fascista dei Trasporti terrestri e della Navigazione interna (Italy)	2
957	**Peyroncely** (M.)	Spanish Local Organising Committee	2

Number.	NAME.	DELEGATED BY	SECTIONS.
44	Philippe (G.)	Permanent Commission of the Association and Chemin de fer du Nord (Nord-belge Lines) (Belgium)	1, 2, 3
967	Pignet (F.)	Ministère des Relations extérieures (Paraguay)	1, 2, 3, 4, 5
286	Pino y del Pino (F. del)	Chemins de fer de l'Ouest de l'Espagne (Spain)	1, 2, 3
871	Pinto Machado (C.)	Ministère du Commerce et des Communications (Portugal)	2
269	Pirard (A.)	Chemins de fer Catalans (Spain)	1, 2, 5
938	Planas (J.)	Permanent Commission of the Association (Section secretary)	4
919	Plogsted (W. J.)	Secretary of State (U. S. A.)	—
859	Poirel	Ministère des travaux publics (France)	4
202	Pokorny (K.)	Deutsche Reichsbahn-Gesellschaft (Germany)	3
979	Polanco (L. T.)	Ferrocarril Cantabrico (Spain)	—
730	Ponticelli (E.)	Chemins de fer de l'Etat (Italy)	1, 3
973	Poor (F. A.)	Secretary of State (U. S. A.)	—
613	Porat (H. von)	Chemins de fer Boräs Herrljunga och Varberg-Boräs (Sweden)	1, 2, 3
312	Porchez (A.)	Chemins de fer de l'Etat (France)	1, 4
641	Pourcel (A.)	Union Internationale des Chemins de fer	2, 3, 4
846	Prados Ruiz (F.)	Ministère du Fomento (Spain)	1, 4, 5
569	Pretorian (S.)	Chemins de fer de l'Etat (Rumania)	1, 3, 4
638	Price (P. H.)	Railway Clearing House (Great Britain)	4
285	Prieto y Vives (A.)	Chemins de fer de l'Ouest de l'Espagne (Spain)	1, 2, 3
486	Procter (E.)	Burma Railways (India)	1, 3, 5
849	Prot	Ministère des travaux publics (France)	1
786	Proudlock (R.)	North Western Railway (India)	—
937	Puig (J.)	Permanent Commission of the Association (Section secretary)	3
367	Quinquet	Chemins de fer de Paris à Lyon et à la Méditerranée (France)	1, 2
504	Raper (J. H. F.)	Great Indian Peninsula Railway	4, 5
896	Rau (P. R.)	Government of India (Railway Board)	—
835	Rebollo y Canales (G.)	Ministère du Fomento (Spain)	—
935	Reder (G.)	Permanent Commission of the Association (Section secretary)	—
317	Regnauld (Ch.)	Chemins de fer d'Alsace et de Lorraine (France)	2, 4
325	Renard (R.)	Chemins de fer de l'Est (France)	1, 3, 4
731	Renda (B.)	Chemin de fer de l'Etat (Italy)	1
408	Renevey	Chemin de fer de Paris à Lyon et à la Méditerranée (Algerian Lines)	2, 4
939	Reparaz (F.)	Permanent Commission of the Association (Section secretary)	—
366	Reure	Chemins de fer de Paris à Lyon et à la Méditerranée (France)	2, 4
767	Reynek	Chemins de fer de l'Etat (Czechoslovakia)	3, 4, 5
191	Ribera (J. E.)	Chemin de fer de Tanger à Fez (Morocco)	1, 3
578	Ribitch (B.)	Chemins de fer de l'Etat (Jugoslavia)	2, 3
925	Richards (E. A.)	Buenos Ayres Great Southern Railway (Argentine)	3, 4
348	Richemond (P.)	Chemins de fer de Paris à Orléans (France)	1 to 5

Number.	NAME.	DELEGATED BY	SECTIONS.
364	**Richon**	Chemins de fer de Paris à Lyon et à la Méditerranée (France)	2 4
551	**Rijckevorsel**	Chemins de fer néerlandais (Netherlands)	1, 3, 4
987	**Rios** (F. Garcia de los) . .	Spanish Local Organising Committee .	—
903	**Risgallah** (Youssef Bey). .	Chemins de fer de l'Etat (Egypt) . . .	3, 4, 5
320	**Robaglia** (M.)	Chemins de fer de Ceinture de Paris (France)	3, 4
759	**Roberts** (G.)	London Midland & Scottish Railway (Great Britain)	—
965	**Robinson** (B. M.)	Secretary of State (U. S. A.)	—
947	**Rodriguez** (Rey J.) . . .	Spanish Local Organising Committee .	—
876	**Rohn** (Dr. A.)	Département des Postes et des Chemins de fer (Switzerland)	1, 2, 4
418	**Roland-Gosselin** (J.) . . .	Chemin de fer de Dakar à Saint-Louis (Africa)	1, 2, 3, 4, 5
117	**Ronsse** (A. A. C.)	Société Nationale des Chemins de fer belges (Belgium)	1
963	**Rousseau**	Permanent Commission of the Association (Section secretary)	—
349	**Rousseau** (E.)	Chemins de fer de Paris à Orléans (France)	1 to 5
737	**Rossi** (F.)	Società Trazione Elettrica Lombarda (Italy)	—
891	**Rowntree** (E. W.)	Ministry of Transport (Great Britain) .	3, 4, 5
272	**Rozpide** (J.)	Chemin de fer central d'Aragon (Spain)	1, 3, 4
852	**Ruffi de Pontevès** (de) . .	Ministère des Travaux Publics (France)	2, 3, 4
369	**Ruffieux**	Chemins de fer de Paris à Lyon et à la Méditerranée (France)	1, 2
95	**Ruiz Senen** (V.)	Spanish Local Organising Committee . .	2, 3, 4
766	**Runt** (Ch.)	Chemins de fer de l'Etat (Czechoslovakia)	5
739	**Ruud** (N. H.)	Chemins de fer de l'Etat (Norway) . .	3, 4
917	**Sainsbury** (J.)	Great Western Railway (Great Britain)	4
87	**Sainz** (J.)	Spanish Local Organising Committee .	4
817	**Saito** (Dr. S.)	Japanese Government Railways . . .	1
420	**Sallandrouze de Lamornais** (Ch.)	Chemin de fer de Damas-Hamah et prolongements (Asia Minor)	4
907	**Salvini** (G.)	Ministère des Travaux Publics (Italy) .	3, 4, 5
923	**Sandberg** (C. P.)	Ministère des communications (Siam) .	1
961	**Santini**	Chemins de fer de Paris à Lyon et à la Méditerranée (France)	2
869	**Santos Viegas** (dos) . . .	Ministère du Commerce et des Communications (Portugal)	—
374	**Sapin** (C.)	Chemins de fer Départementaux du Tarn (France)	3, 5
85	**Satrústegui** (Baron de) . .	Spanish Local Organising Committee .	2, 4
621	**Savary**	Chemins de fer fédéraux (Switzerland)	3, 4
536	**Scano** (S.)	Chemins de fer complémentaires de la Sardaigne (Italy)	1, 2, 3
921	**Schleiter** (W. F.)	Secretary of State (U. S. A.)	—
47	**Schrafl** (A.)	Permanent Commission of the Association and Chemins de fer fédéraux (Switzerland)	1, 3, 4
783	**Schrenk** (Dr. H. von) . .	Erie Railroad (U. S. A.)	1, 3, 4
960	**Schutz** (R.)	Chemin de fer d'Alsace et de Lorraine (France)	1

Number.	NAME.	DELEGATED BY	SECTIONS.
182	**Schwarze** (Dr. Ing. B.)	Deutsche Reichsbahn Gesellschaft (Germany)	4
503	**Scott** (J.)	Great Indian Peninsula Railway	3, 4, 5
942	**Seijas** (P.)	Spanish Local Organising Committee	—
441	**Selway**	London & North Eastern Railway (Great Britain)	3, 4
844	**Serret y Mirete** (M.)	Ministère du Fomento (Spain)	1
888	**Sfintescu** (T.)	Chemins de fer de l'Etat (Rumania)	—
444	**Sherrington** (C. E. R.)	London & North Eastern Railway (Great Britain)	2, 3, 4
358	**Silhol** (A.)	Chemins de fer Paris à Lyon et à la Méditerranée (France)	—
988	**Silva** (V. D.)	Chilean Government	—
806	**Simeray**	Compagnie des Chemins de fer du Maroc	3, 4
904	**Simmons** (Col. E. A.)	Secretary of State (U. S. A.)	—
727	**Simoni** (G.)	Chemins de fer de l'Etat (Italy)	3
588	**Simonsson** (G.)	Chemins de fer de Bergslagen (Sweden)	1, 3
554	**Simon-Thomas** (W.)	Chemins de fer néerlandais (Netherlands)	2, 3, 4
743	**Slinkers** (H. L.)	Chemins de fer de l'Etat aux Indes néerlandaises (Dutch Indies)	4
440	**Smeddle** (J. H.)	London & North Eastern Railway	1, 2, 3
625	**Smith** (E.)	London Midland & Scottish Railway	—
974	**Smith** (H. A.)	Secretary of State (U. S. A.)	—
742	**Snethlage** (R. A. E.)	Chemins de fer de l'Etat aux Indes néerlandaises (Dutch Indies)	1, 4
631	**Snoy** (Baron R.)	International Sleeping Car Company	2, 3, 4
284	**Somera** (F. de la)	Chemins de fer de l'Ouest de l'Espagne (Spain)	1, 2, 4
825	**Somerset** (M. P.)	London Midland & Scottish Railway (Northern Counties Committee) (Ireland)	—
550	**Sorel** (A.)	Chemins de fer et Minières Prince Henri (Luxemburg)	2, 3, 4
308	**Soulard** (R.)	Chemins de fer de l'Etat (France)	3, 4, 5
177	**Soulez**	Compagnie du chemin de fer du Nord (France)	2, 3, 4
868	**Sousa Rego** (A. de)	Ministère du commerce et des communications (Portugal)	1
872	**Souza** (J. F. de)	Ministère du commerce et des communications (Portugal)	—
319	**Spach** (Ch.)	Chemins de fer d'Alsace et de Lorraine (France)	3, 4
788	**Spurgeon** (C. E.)	North Western Railway (India)	2, 3, 4
155	**Stäckel** (W.)	Deutsche Reischbahn Gesellschaft (Germany)	3
598	**Stahle** (Com. V.)	Chemin de fer Kalmar-Nya (Sweden)	1, 2, 5
877	**Stalder** (F.)	Département des postes et des chemins de fer (Switzerland)	—
779	**Stamer** (A. C.)	London & North Eastern Railway	1, 2, 3
49	**Stamp** (Sir Josiah)	Permanent Commission of the Association and London Midland & Scottish Railway	—
264	**Stensballe** (J. P.)	Chemins de fer de la Fionie méridionale (Denmark)	1, 2, 5
517	**Stephens** (J. B.)	Great Northern Railway (Ireland)	1, 3, 4

Number	NAME.	DELEGATED BY	SECTIONS.
50	**Stieltjes** (J. J.)	Permanent Commission of the Association and Ministère du Waterstaat (Netherlands)	—
688	**Stockton** (Sir E.)	London Midland & Scottish Railway	3, 4
792	**Stowell** (Lt. E. C. S.)	North Western Railway (India)	1, 4, 5
905	**Strong**	Department of State (U. S. A.)	—
955	**Suárez** (N.)	Spanish Local Organising Committee	—
490	**Sullen** (A. E. B.)	Eastern Bengal Railway (India)	1
311	**Surleau** (F.)	Chemins de fer de l'Etat (France)	1, 4, 5
886	**Swain** (. H.)	East Indian Railway	1
941	**Tapia** (J.)	Permanent Commission of the Association (Section secretary)	5
397	**Tartary** (G.)	Tramways Départementaux des Deux-Sèvres (France)	1, 3, 5
752	**Tarwid** (S.)	Chemins de fer de l'Etat (Pologne)	3, 4
748	**Taszycki** (Z.)	Chemins de fer de l'Etat (Pologne)	3, 4
698	**Tatlow** (F.)	Midland & Great Northern Railways, Joint Committee (Great Britain)	2, 3, 4
887	**Taylor** (G. R. T.)	London Midland & Scottish Railway (Great Britain)	—
630	**Teague** (G. W.)	North Western of Uruguay Railway	3. 4
172	**Tecklenburg** (Dr. Ing. K.)	Deutsche Reichsbahn Gesellschaft (Germany)	4
870	**Teixeira de Queiroz** (A.)	Ministère du commerce et des communications (Portugal)	—
386	**Ternynck**	Chemins de fer secondaires du Nord Est (France)	—
347	**Tettelin** (F.)	Chemin de fer du Nord (France)	1, 3, 4
65	**Teugels** (V.)	Permanent Commission of the Association (Office of the Executive Committee)	—
597	**Thott** (Baron A.)	Helsingborg-Hässleholms-Railway (Sweden)	2, 3, 4
927	**Thrupp** (R. M. D.)	Permanent Commission of the Association (Section secretary)	2
669	**Tiemroth** (Ch.)	Chemin de fer Lolland-Falster (Denmark)	4
226	**Tilly** (R. de)	Chemins de fer de Rosario à Puerto Belgrano (Argentine)	3, 4
331	**Tirard**	Chemins de fer du Midi (France)	4
851	**Tissier** (Th.)	Ministère des Travaux publics (France)	—
979	**Torrès** (L. Polanco)	Ferrocarril Cantabrico (Spain)	—
733	**Tosti** (L.)	Chemins de fer de l'Etat (Italy)	4. 5
346	**Toutain** (L.)	Chemins de fer du Nord (France)	1. 3, 4
412	**Trélat** (J.)	Compagnie Fermière des Chemins de fer tunisiens (Tunis)	4
790	**Trevor** (M. D. B.)	North Western Railway (India)	3, 4
360	**Tuja**	Chemins de fer de Paris à Lyon et à la Méditerranée (France)	3, 4
750	**Tuz** (A.)	Chemins de fer de l'Etat (Poland)	3, 4
943	**Urgoïti** (J.)	Spanish Local Organising Committee	—
74	**Urquijo** (Marquis E. d')	Permanent Commission of the Association (Spanish Section)	—
836	**Valcarcel y de Mesa** (V.)	Ministère du Fomento (Spain)	3
53	**Valenciano y Mazerès** (A.)	Permanent Commission of the Association	—

Number.	NAME.	DELEGATED BY	SECTIONS.
424	**Valentin** (R.)	Chemins de fer Smyrne-Cassaba et prolongement (Asia Minor)	2, 5
734	**Valeri** (C.)	Chemins de fer de l'Etat (Italy)	4
143	**Vallancien**	Permanent Commission of the Association (reporter)	2
362	**Vallantin**	Chemins de fer de Paris à Lyon et à la Méditerranée (France)	2, 4
828	**Van Leeuw** (L.)	Ministère des Colonies (Belgium)	5
188	**Van Noorbeeck**	Société Nationale des Chemins de fer vicinaux (Belgium)	1, 3 5
883	**Van Rijn** (J. P.)	Société Nationale des Chemins de fer belges (Belgium)	—
556	**Van Scouwenburg** (W. H.).	Société des Chemins de fer aux Indes néerlandaises (Dutch Indies)	2, 4
879	**Van Waefelghem**	Société Nationale des Chemins de fer belges (Belgium)	—
820	**Vanzi**	Confederazione Nazionale Fascista dei Trasporti terrestri e della Navigazione interna (Italy)	—
276	**Vargas** (F. de)	Chemins de fer du Nord de l'Espagne (Spain)	2, 3, 4
561	**Vaconcellos Correia** (A. de)	Compagnie des Chemins de fer portugais (Portugal)	1, 2, 3
721	**Velani** (L.)	Chemins de fer de l'Etat (Italy)	2, 3, 4
195	**Velleman** (Dr. A.)	Permanent Commission of the Association (Section secretary)	—
232	**Verwilghen** (A.)	Chemin de fer Malines-Terneuzen (Belgium)	2
559	**Vianna** (Ferreira de Silva Luiz).	Chemin de fer portugais de la Beira-Alta (Portugal)	4
55	**Vickers** (D.)	Permanent Commission of the Association and London Midland & Scottish Railway	—
280	**Villamil** (F.)	Chemins de fer du Nord de l'Espagne (Spain)	2, 4
885	**Vining** (Lt. Col. L. E.)	East Indian Railway	3, 4
580	**Virgin** (I)	Chemins de fer de l'Etat (Sweden)	2
622	**Volmar** (F.)	Chemins de fer des Alpes bernoises-Berne-Loetschberg-Simplon (Switzerland)	3, 4
160	**Voorhees** (H. B.)	Baltimore & Ohio Railroad (U. S. A.)	3
800	**Wagenaere** (V. de)	Port et Chemin de fer de Lourenço-Marques (Portuguese East Africa)	3
916	**Wagner** (É.)	Erie Railroad (U. S. A.)	—
130	**Wagner** (P.)	Deutsche Reichsbahn Gesellschaft (Germany)	2
950	**Wais** (F.)	Spanish Local Organising Committee	3, 4
515	**Wallace** (W. K.)	County Donegal Railways Joint Committee (Ireland)	1. 2
595	**Wallenberg** (O.)	Chemin de fer Halmstad-Nassjö (Sweden)	3, 4, 5
829	**Wang** (Sheng Z.)	Ministère des chemins de fer (China)	—
878	**Warte**	Société Nationale des chemins de fer belges (Belgium)	2
340	**Waru** (M. de)	Chemin de fer du Nord (France)	3, 4, 5
749	**Wasilewski** (S.)	Chemins de fer de l'Etat (Poland)	2, 5
170	**Wasiutyński** (A.)	Chemins de fer de l'Etat (Poland)	1, 3, 4

Number.	NAME.	DELEGATED BY	SECTIONS.
699	**Watson** (A. G.)	South African Railways and Harbours	—
445	**Watson** (H. A.)	London & North Eastern Railway	3. 5
781	**Wauwermans** (P.)	Chemin de fer de Chimay (Belgium)	4
136	**Wechmann** (Dr. Ing. W.)	Deutsche Reichsbahn Gesellschaft (Germany)	2
57	**Wedgwood** (Sir Ralph Lewis)	Permanent Commission of the Association and London & North Eastern Railway	—
616	**Weiss**	Chemins de fer fédéraux (Switzerland)	2
617	**Werdt** (von)	Chemins de fer fédéraux (Switzerland)	1, 3
708	**Westwood** (J. D.)	Bengal & North Western Railway (India)	3, 5
643	**Wickström** (F.)	Union des chemins de fer privés (Sweden)	1, 3
683	**Wiggins** (W. D.)	Pennsylvania Railroad (U. S. A.)	1
166	**Wilkinson** (H. L.)	Great Western Railway (Great Britain)	4
156	**Willaert** (G. C. A.)	Société Nationale des Chemins de fer belges (Belgium)	1. 2, 3
215	**Williams** (W. C.)	Buenos Ayres Western Railway (Argentine)	2
56	**Willich** (J. S. de V., von)	Permanent Commission of the Association (Office of the High Commissioner for the Union of South Africa)	1, 4, 5
430	**Wilson** (The Right Hon. John William)	Great Western Railway (Great Britain)	2, 3
655	**Wilson Barker** (Sir David)	Nitrate Railway (Chile)	1, 2, 3, 4
596	**Wiman** (Com. A.)	Chemin de fer Halmstad-Nässjö (Sweden)	3, 4, 5
171	**Wishart** (W. C.)	New York Central Lines (U. S. A.)	—
59	**Wolf** (P.)	Permanent Commission of the Association and Deutsche Reichsbahn Gesellschaft (Germany)	1, 2, 3, 4, 5
830	**Woo** (K. Y.)	Ministère des Chemins de fer (China)	—
795	**Yates** (Capt. R. W. P.)	North Western Railway (India)	—
481	**Young** (S. G. S.)	Bombay, Baroda & Central India Railway	3, 4, 5
576	**Yoyitch** (M.)	Chemins de fer de l'Etat (Jugoslavia)	2. 3
577	**Yokovitch** (D.)	Chemins de fer de l'Etat (Jugoslavia)	2
918	**Yumoto**	Japanese Government Railways	—
122	**Zavadil** (St.)	Ministère des chemins de fer (Czechoslovakia)	—
192	**Zavadjil**	Chemins de fer de l'Etat (Jugoslavia)	2, 5
370	**Zens** (A.)	Chemins de fer Départementaux (France)	4
167	**Zietzschmann** (Dr. jur. H.)	Deutsche Reichsbahn Gesellschaft (Germany)	4

OPENING CEREMONY OF THE 11th SESSION,

5 May 1930, at 4. 0 p. m.

At 4 o'clock H. M. King ALFONSO XIII arrived by automobile at the Senate House. His Majesty was received at the entrance by the Spanish Executive Committee, the President of which, Mr. GAYTAN DE AYALA, presented the President of the Permanent Commission, Mr. FOULON, and the General Secretary, Mr. GHILAIN. His Majesty then proceeded to the Royal Saloon where several other Members of the Commission were presented to him. At 4.20 His Majesty entered the Meeting Hall which was crowded with Delegates, who received him with prolonged applause. His Majesty took the President's seat and declared the Meeting open. On his right were seated the Prime Minister, General BÉRENGUER, Mr. FOULON and Mr. MARTINEZ ACACIO, the Director of Public Works, and on his left Mr. MATOS, Minister of the « Fomento » (1), Mr. GAYTAN DE AYALA and Mr. BOIX, the Managing Director of the North of Spain Railway Company and President of the Delegation of the Spanish Railway Companies.

His Majesty the King called upon His Excellency the Minister of the « Fomento » who spoke in the following words :

(1) The Fomento includes Public Works, Education, Agriculture, Commerce and Manufactures.

Speech made by H. E. the Minister of the « Fomento ».

« Your Majesty, Ladies and Gentlemen,

« I greatly appreciate the honour laid upon me, and I feel the weight of my duty by having to make the first speech at the opening of the Congress. I fear I shall not be able to rise to the occasion but at the same time I hope my fervent feelings of enthusiasm and admiration for all those who constitute this Congress will make up for that insufficiency, so as to bring it to the level of the solemnity of this moment. In the first place I have to greet the high authorities and people of great scientific representation who are here assembled. I also wish to express the gratitude of the Government not only to the Nations who have sent their Representatives here but also to the Association for having designated Spain, and in particular Madrid, as the meeting-place of this Congress.

As I said I have the task and honour of pronouncing the first speech in this *International Railway Congress*. It would almost have been sufficient to have pronounced these three last words in order to make this speech superfluous. For everybody has only to meditate upon the significance of these words to understand the importance of this Meeting. The term *Congress* itself suggests the

reunion of men, specialized in scientific work, and who meet in order to realise the improvements which are the object of this Congress. But the Congress is not merely what we have just now before our eyes. I have visions of something more intimate, something more concentrated. I have before my mind's eye the Permanent Commission which prepares the work in order that a Congress of this description may take place. And it is this Commission which essentially constitutes a juridical personality whose domicile is the entire world, which, meeting periodically, prepares the ground whereby the Congress may fulfil its work and achieve its end. And I further see the scientist in his laboratory, the engineer in the factory, the financier in his office, and also you all who are not permanently members of the Congress, each in his respective country, collecting information, searching for scientific truth, endeavouring to discover the secrets of nature, thinking out means for giving them practical application and subduing them for the welfare of mankind, in order to make fruitful the exchange of impressions taking place in this periodical Congress, to which everybody brings his science and his experience, the coupling of which leads to prosperity and progress.

This Congress has an essentially *international* character, that is to say the national frontiers have disappeared and the goodwill common to us all has made us forget them, so that « Internationality means fellowship, peace, and tranquility ».

What is the object of this International Congress? *Railways;* this third memorable word « Railways » means transport between countries, transport of ideas, of initiatives. It is the Railways which allow us to know different countries, which transport us beyond their national frontiers, allow us to understand their thoughts and which allow us to have friendly relations with our neighbouring countries, and which also allow Nations who live far apart to meet and discuss matters of scientific research and of scholarship.

International Railway Congress. Congress means Peace, International means Fellowship, Railways means not only transport, but progress. This Congress did not come into existence until to-day when it was opened by His Majesty and it will not come to a close when it is adjourned. It will continue to live, because it will continue to inspire all members with a desire to continue the work with the realization of the wellbeing, not merely of any one nation, but the wellbeing of humanity and the progress of all peoples. And I fervently desire that the ideas attached to these three words « International Railway Congress » will lead to the conclusion of permanent friendships not only in scientific progress but in the happiness of Nations.

In the name of the Government, I welcome all the Members. Spain's accomplishments in the railway field are known to everybody. The constant object of all the Governments who have succeeded each other has always been the improvement of existing railways and the construction of new lines. The financial efforts of other nations in the same direction are also known to us all.

I trust that, when the moment comes when we shall have to bid farewell to each other, we shall feel that cordial and permanent friendships have been formed and that every one of you will take back to his country pleasant remembrances of Spain and of its kind and friendly welcome. » *(Prolonged applause.)*

Mr. Foulon, President of the Permanent Commission, replied as follows :

« Your Majesty,

« In the name of the 900 official delegates to the XIth session of the Railway Congress, I have the great honour of expressing most respectfully to your Majesty our lively gratitude for the lustre which your Majesty has graciously given to our Congress in deigning to accept the honorary Presidency.

We shall cherish, Your Majesty, the most enduring and gratifying memory of it. (*Applause.*)

I have also the pleasant duty of expressing our warmest thanks to the Spanish Government and especially to His Excellency the Minister of the Fomento for the hearty welcome which it has extended to us, and to the managements of the great Railway Companies who have been so good as to take under their aegis the organization of the Congress.

The Spanish Local Commission, composed of distinguished members of the railway world, has made the happiest arrangements to insure the complete success of the Congress, and has paid us a a delicate attention by enabling Delegates and their families to appreciate some of the principal beauties of Spain.

I wish to assure them of our great gratitude. (*Hear, hear.*)

Since the last session, we have to mourn the death of Messrs. de Corné (Italy); Pérouse, Heurteau and Mauris (France); Kunz (Switzerland); de Burlet and Vanderrydt (Belgium), who were members or former members of the Permanent Commission; also that of Mr. Holemans, Secretary-treasurer, who had carried out these important duties ever since the beginning of our Association.

I render sincere homage to the memories of those distinguished and devoted colleagues; their memory will be kept alive amongst us in the general esteem in which they were held.

The International Railway Congress Association was founded in Belgium in 1885.

Its development and activity have continued to increase with astonishing rapidity.

At its foundation, it comprised 19 Governments and 131 Administrations, and represented 31 250 miles of railways in operation.

In 1920 the affiliated railway lines had reached a total of 245 250 miles.

To-day the Association includes 42 Governments and 230 Administrations working 387 500 miles of railway lines, and this proves the universal interest taken in its labours.

The problems of the railway industry form the subject, throughout the whole world, of the serious consideration and study of technical experts of the greatest ability.

The Congress enables qualified specialists to compare the results of their experience and to learn in an atmosphere of frankness and competency what new progress can be made in the different fields.

Amongst the questions on the agenda of the present session, I shall quote the following :

1. The use of concrete and reinforced concrete on railways;

2. The resistance of rails against breakage and to wear;

3. Locomotives of new types, in particular turbine locomotives and internal combustion motor locomotives;

4. Electric locomotives for main line traction;

5. Relations between railways and seaports;

6. Signalling of lines for fast traffic and in main stations;

7. The co-operation of the staff towards increased efficiency and its participation in the profits;

8. The establishment of penetration railways;

9. The improvements in the permanent way equipment of light railways and the electrification of secondary lines.

Preparation for the discussions which are about to open has been made by collecting from all the Railway Administrations of the world a great amount of information, the important features of which have been brought to light by the Reporters.

In the name of the Permanent Commission, I thank these collaborators very heartily for their valuable work.

I have no doubt that with the assistance of all the delegates much and valuable information will result from the discussions.

There is patent in all countries a veritable rivalry for improving communications between nations and for bringing about unceasingly fresh improvements in the working of railways.

We have followed with great interest the particularly lively progress which has been made in Spain in the last few years in the railway field :

— by the construction of the Transpyrenean lines from Bedouce to Jaca and from Ax-les-Thermes to Ripoll, as well as the alteration to European gauge of the line from Ax and Ripoll to Barcelona, combined in the last-named city with the building of a central underground station and direct access to the port.

— by the installation of electric traction on the Northern lines,

— by the putting into commission of extremely powerful engines and by building rolling stock for passenger traffic, of the most up-to-date pattern.

We trust and hope that under the enlightened authority of the Government and the wise and progressive guidance of the great Companies the Spanish Railways will continue to contribute to the wide development and prosperity of their country. » *(Long applause.)*

Mr. Boix, President of the Delegation of the Spanish Railway Companies, then spoke as follows :

« Ladies and Gentlemen, Delegates to the Congress,

« As President of the Delegation of the Spanish Railway Companies, in the Higher Council of Railways, and in their name, the honour falls to my lot of greeting the representatives of the Railways of the whole world gathered here for the present Congress which is honoured by the presence of H. M. King Alfonso XIII (whom God preserve) who, in accordance with his unceasing tradition of associating himself with every manifestation of culture and progress, has graciously accepted the honorary presidency of this meeting, dedicated to the study of subjects all of which tend to the perfection and progress of the railway service, and which moreover is an eloquent testimony of respect for and admiration of our Country.

In consequence of the decision taken at the last Session in London to hold the 11th Congress in the capital of Spain, the Spanish railways, fully appreciative of and gratified by the honour thereby paid their country, and with the effective assistance of their Government,

have made the arrangements necessary for the organization of the Said Congress (which, in the interest and importance of the questions to be considered during it, yields in no way in standing to its predecessors), so that its functions of enquiry and investigation may be fulfilled.

Through circumstances known to all and which, therefore, I need not go into here, our railways cannot be compared with many foreign lines here represented in regard to the intensity or the consequent organisation of their services, but we indeed hope you will appreciate the efforts we have made, under unfavourable circumstances, to improve and perfect them.

We also hope that your journeys in Spain and the excursions we have organised for you in our Country will enable you to appreciate its artistic and natural beauties as well as its own particular character.

The Companies have done their uttermost and made use of all their resources to make your visit agreeable.

On this, for us, serious occasion, we offer you a most hearty welcome and our most fervent wishes that when you have returned to your respective countries you will preserve the happiest memories of the too short stay you have spent with us. » *(Pronlonged applause.)*

Second speech by Mr. Foulon, President of the Permanent Commission.

« Gentlemen,

« His Excellency, Mr. Matos, Minister of the « Fomento », in the name of the Spanish Government and Mr. Boix, on behalf of the Spanish Railways, have been good enough to extend in particularly kind terms a welcome to the Delegates to the Congress and have stressed in the most flattering terms the importance of our International Sessions.

On behalf of the Association, I thank them most warmly. (*Applause.*)

I have now the pleasant duty of proposing as Honorary Vice-President of the Congress His Excellency Mr. Matos, Minister of the « Fomento » and also his distinguished predecessor in that Office, Count Guadalhorce, both of whom have devoted all their efforts and their great authority to the proper organisation and to the success of the Congress. (*Applause.*)

Gentlemen, we have now to select the great personality who will undertake the heavy and delicate task of acting President of the Session.

Mr. José Gaytan de Ayala, President of the Council of Public Works of Spain, whose nomination I have the honour to propose, is assuredly, on account of the prestige his name carries, his great competence and his experience, the fit and proper person to carry out these important duties. (*Applause.*)

As regards the appointments of Vice-Presidents, I am sure we shall agree unanimously they be offered to four Spaniards of the greatest distinction :

Messrs. E. Maristany, Marquis d'Argentera, General Manager of the Madrid-Saragossa-Alicante Railway Company, Member of the Permanent Commission of the Association;

F. Boix, Director and Manager of the North of Spain Railway Company;

L. Morales, Vice-President of the Spanish Superior Railway Council, Chairman of the Board of Management of the West of Spain National Railway Company;

M. Valenciano y Mazeres, Director of

the Madrid-Saragossa-Alicante Railway Company, Member of the Permanent Commission of the Association. (*Renewed applause.*)

The Permanent Commission is fully convinced that under the direction of this « élite », the Congress will be most successful. »

Mr. Gaytan de Ayala spoke as follows :

« Gentlemen,

« Whilst deeply grateful to the illustrious President of the Permanent Commission for having proposed, and to the Congress for having elected me as acting President of this 11th Session, an office out of all proportion to my merits, I experience a great fear that I shall be unable to attain to the level of a duty which has always been laid upon persons of eminence.

The custom of electing as acting President a native of the nation in which the Congress meets may explain my election, but it does not justify it, because there are amongst us personalities of Spanish nationality who would have occupied this post with greater claims to it and with greater authority. Perhaps the fact of my having presided over the Local Organizing Committee may have induced the Permanent Commission to propose me for a post which, without your help and benevolence, I could not fill satisfactorily. In accordance with your vote and solely to gratify your real desire to offer Spain a testimonial of warm sympathy and special consideration, I accept this unmerited honour as a patriotic duty.

We have now to choose two general and three assistant Secretaries to complete the Secretariat of the Congress. I know of no more fitting names to propose as General Secretaries, than those of Mr. Paul Ghilain, General Secretary of the Permanent Commission and Mr. Augusto Krahe, Chief-Engineer of the Management of the Western Spanish Railways and General Secretary of the Local Organizing Committee and of the Executive Committee and as Assistant General Secretaries, Sir Henry Fowler, Chief Mechanical Engineer of the London Midland & Scottish Railway; Mr. Wolff, Director of the German State Railway Company, and Mr. José García-Lomas, Engineer of the Management of the North of Spain Railways, Secretary of the Local Commission and the Executive Committee.

As I am sure of your vote, I consider them elected unanimously. (*Applause.*)

By resolution adopted at the closing meeting of the Rome Congress, the 10th session of the International Railway Congress ought to have been held in Madrid in 1927. Our English colleagues having expressed the wish that that celebration session be held in London in 1925 in order to coincide with the centenary of the opening of the first public railway line in the world, and the Spanish Government, considering the English desire fully justified, gave its complete support to the desire of the Congress that the 10th session should be held in London in 1925 and the 11th in Madrid in the present year.

This is why we are now met together here in this hall in the Spanish Senate House lent by the Government for the holding of the Congress which has been solemnly declared open by H. M. the King, the Honorary President, to whom, for having deigned to accept His nomination and for having personally presided at the inauguration, for the great interest He has taken in its organization from the first, and for the valuable aid He has lent us, sure of interpreting the

feelings of the Delegates, I offer their homages of respectful affection and high esteem.

His Excellency, the Minister of the « Fomento », has said with great eloquence that Spain is deeply grateful for your visit by which she feels flattered; I venture to repeat to you, in the name of the Spanish Authorities represented at this Congress, our warmest thanks. At the same time I offer you a very hearty welcome, hoping your stay in Spain will be pleasant. I greet in you the most illustrious representatives of the world's railway science and I cherish the certainty that, as on other similar occasions, you will achieve in the session inaugurated to-day, a work which will be useful and profitable for the progress and perfection of transportation, as for the creation and development of peace and fellowship movements.

During the preparatory period of this 11th session, the Spanish Local Committee, and especially its Executive Committee, has kept in constant touch with the Permanent Commission in Brussels, from which it has at every moment received useful advice and the most wise assistance.

Thanks to this collaboration, we hope to show you a satisfactory organization of the complex services of the Congress, such as will enable you to carry out in ease and comfort a task the results of which find their surest guarantee of success in the scientific ability and the specialized knowledge of the eminent personalities attending this gathering.

The illustrious President of the Permanent Commission, Mr. Foulon, has enumerated in his excellent speech the important questions which will be submitted to examination and discussion in the five sections and the plenary meetings of the Congress, questions of great interest covering all sections of railway science. From the study you will make of them you will draw conclusions which will enrich and perfect the results of former Congresses.

Mr. Foulon also has uttered kind expressions of praise for the efforts made in Spain such as in building the Transpyrenean railways, electrifying the important North Company's lines, and in perfecting the locomotives and rolling stock.

As regards railway matters, Spain has indeed made relatively slow progress; the building up of a network of more than 10 000 miles does not fully meet the country's needs, nor is it sufficient to establish, with all the desired completeness, the national, international and intercontinental communications which, on account of her geographical situation she is destined to serve. Our relative backwardness is first of all explained : by the political and economic difficulties in the second half of the last century and the first decades of the present, with their cruel and wasting civil and colonial wars with their tragic results : the cost of many lives and a great amount of capital thereby lost to the industrial progress of the nation; by the orography of the country, which results in locations of excessive length, construction with very heavy gradients and costly works when establishing the great arteries of the system which run through very broken country at high altitude; by the lighter density of the population (119 inhabitants to the square mile) and unequal distribution over the central area, the coasts and the frontiers.

On the other hand, almost the whole of the railways having been constructed by private enterprise, on a short-term concession and with only a small subsidy, the first capital expended with such

costly operation did not make sufficient profit to encourage further investments.

However, with patriotic satisfaction I can say, confirming Mr. Foulon's words, that we are entering into a period of real progress as regards transport matters.

The illustrious Honorary Vice-President of this Congress that eminent Civil Engineer, the Count of Guadalhorce, who has controlled the Ministry of the Fomento for the past five years, with a lofty vision of the great national problems entrusted to his ministerial department has included amongst the most important and pressing decisions made, the improvement of the network of railway communications, and the construction by the State of new lines, and at the same time, by means of efficacious monetary aid, has assisted in the improvement of those lines actually working.

Taking into consideration the major share of the State in the primary costs of laying down certain lines (which if they do not give an immediate return to those who run them, yet will render from the first moment considerable direct and indirect benefits to the national Treasury), it may be hoped that, without much delay, we shall be able to count on a railway system in proportion to our political and geographical importance, such as will allow us to reach the level of other more fortunate nations who have narrowed as far as they can possibly desire the meshes of their vast networks of lines, and now limit their efforts to perfecting their services.

The presence in the Ministry of the Fomento of the actual Minister, Mr. Matos, Honorary Vive-President of this Congress, the patriotism of the Government, the enthusiasm of His Majesty for anything which contributes to the nation's prosperity, and the country's eagerness for progress will all contribute to the realisation of the work now going on, and your learned teachings, which we shall know how to take advantage of in due course, will enable us to tackle the questions dealt with in the certainty of arriving at succesful solutions.

The discussions will open to-morrow, Tuesday, at 9.30 a. m. simultaneously in the five Sections. The Delegates registered for the same, after electing the Executives, will discuss the subjects included in the agenda, of which all Delegates are aware from the programme drawn up. You will be free during the afternoons, which you can employ making the trips and excursions for which you are booked, thus combining business with pleasure. The Spanish Nation, appreciative of your visit, will give you a earty welcome everywhere, and will give you the opportunity of seeing the great monuments and ancient cities mentioned in its brilliant history. We hope and trust you will retain a pleasant and enduring memory thereof.

In conclusion, I would repeat that I am entirely at your service and that I beg you most earnestly to forgive with generous indulgence any shortcomings which I may display. » *(Long applause.)*

* * *

At 4.45 p. m. His Majesty closed the meeting and amidst loud cheers retired to the Royal Saloon. A number of leading personalities in the railway world were presented to Him, after which light refreshments were served.

His Majesty left the Senate House at about 5.20 p. m. amidst scenes of the greatest enthusiasm.

GENERAL OFFICERS OF THE SESSION

Honorary President :

H. M. KING ALFONSO XIII.

Honorary Vice-Presidents :

Mr. MATOS, Ministre du Fomento;

Le Comte DE GUADALHORCE, ancien Ministre du Fomento.

Acting President :

José GAYTAN DE AYALA, ancien Président du Conseil des travaux publics d'Espagne.

Vice-Presidents :

E. MARISTANY, Marquis d'Argentera, Directeur Général de la Compagnie des chemins de fer de Madrid à Saragosse et à Alicante (member of the Permanent Commission of the Association).

F. BOIX, Administrateur-directeur de la Compagnie des chemins de fer du Nord de l'Espagne.

L. MORALÈS, Vice-président du Conseil Supérieur des chemins de fer d'Espagne, Président du Conseil d'Administration de la Compagnie Nationale des chemins de fer de l'Ouest de l'Espagne.

A. VALENCIANO Y MAZERÈS, Administrateur de la Compagnie des chemins de fer de Madrid à Saragosse et à Alicante (member of the Permanent Commission of the Association).

Statutory Vice-Presidents (1) :

Belgium. — J. CASTIAU, Directeur Général au Ministère des Transports (member of the Permanent Commission of the Association).

Brazil. — C. A. MONIZ-CORDILHO, Chargé d'Affaires du Brésil à Madrid.

Bulgaria. — J. DANTSCHOFF, Directeur des constructions des chemins de fer.

Chile. — C. GUZMAN DONOSO, Ingénieur du Ministère du Fomento.

China. — Sheng-Z. WANG, Membre du Ministère des Chemins de fer du Gouvernement national de la République chinoise.

Czechoslovakia. — P. KOLLER, Directeur-adjoint des Chemins de fer de l'Etat.

Denmark. — T. A. ALSTRUP, Directeur Général des Chemins de fer de l'Etat (member of the Permanent Commission of the Association).

Egypt. — Mustafa Hamdy EL KATTAN Bey, Ingénieur en chef des Chemins de fer de l'Etat.

Finland. — V. V. AIRAS, Directeur du service de la Traction des chemins de fer de l'Etat.

France, Protectorates and Colonies :

A) *France.* — C. COLSON, Membre de l'Institut, vice-président honoraire du Conseil d'Etat, membre du Conseil Supérieur des chemins de fer (vice-president of the Permanent Commission of the Association).

B) *Protectorates and Colonies :*

Tunis. — BUOVOLO, Directeur du Contrôle des chemins de fer à la Direction générale des travaux publics.

Germany. — F. BESSER, Ministerialrat im Reichsverkehrsministerium (member of the Permanent Commission of the Association).

Great-Britain, India, Dominions, Protectorates and Colonies :

A) *Great-Britain.* — Sir Cyril W. HURCOMB, K.B.E., C.B., Secretary to the Minister of Transport (member of the Permanent Commission of the Association).

B) *India.* — P. R. RAU, Director of Finance, Railway Board.

C) *New South Wales.* — A. D. J. FORSTER, Assistant commissioner to the State Railways.

(1) Article 13 of the Rules and Regulations of the Association.

Greece. — G. P. Bouyoukas, Directeur Général des chemins de fer.

Irish Free State. — F. Cawley, Secrétaire de la Légation de l'Etat libre d'Irlande à Paris.

Italie. — S. E. le Prof. Belluzzo, Ministre d'Etat.

Japan. — S. Matsunawa, Doctor of engineering, Chief of the Railway Research Office.

Netherlands. — J. J. Stieltjes, Inspecteur général des chemins de fer et des tramways (member of the Permanent Commission of the Association).

Norway. — A. G. Jynge, Directeur à l'Administration centrale des Chemins de fer de l'Etat

Paraguay. — F. Pignet, Consul général, attaché à la Légation du Paraguay à Madrid.

Poland. — W. Czapski, Ingénieur, Sous-secrétaire d'Etat au Ministère des Communications.

Portugal. — A. de Sousa Rego, Ingénieur, Directeur général des chemins de fer.

Rumania. — S. Pretorian, Président du Conseil d'Administration des Chemins de fer de l'Etat roumain.

Siam. — P. S. Banchong.

Spain. — B. Calvet, Inspecteur général des Ponts et Chaussées, Conseiller des travaux publics.

Sweden. — I. Virgin, Directeur en chef aux Chemins de fer de l'Etat.

Switzerland. — H. Hunziker, Ingénieur, Directeur de la division des chemins de fer au Département fédéral des Postes et des Chemins de fer (member of the Permanent Commission of the Association).

United States of America. — Colonel E. A. Simmons.

Jugoslavia. — B. Djouritchitch, ancien Directeur général des Chemins de fer de l'Etat.

General Secretaries :

P. Ghilain, Ingénieur en chef au service du Matériel de la Société Nationale des chemins de fer belges (General Secretary of the Permanent Commission of the Association).

A. Krahe, Ingénieur en chef à la Compagnie Nationale des chemins de fer de l'Ouest de l'Espagne.

Assistant general Secretaries :

Sir Henry Fowler, K. B. E., Chief Mechanical Engineer, London Midland and Scottish Railway (member of the Permanent Commission of the Association).

J. M. Garcia-Lomas, Ingénieur attaché à la Direction de la Compagnie des chemins de fer du Nord de l'Espagne.

Wolf, Geheimrat, Direktor der Deutschen Reichsbahn-Gesellschaft, Mitglied des Direktionskomitees dieser Gesellschaft (member of the Permanent Commission of the Association).

OFFICERS OF SECTIONS.

SECTION I. — Way and Works.

President : Sir Charles L. Morgan, C. B. E., Director, Southern Railway (Great Britain).

Vice-Presidents : F. Fiori, Administrateur des Chemins de fer de l'Etat italien (member of the Permanent Commission of the Association).

P. Lévy, Ingénieur en chef attaché à la Direction des Chemins de fer de l'Etat français.

Principal Secretary : R. Despreets, Ingénieur principal à la Société Nationale des chemins de fer belges (assistant secretary of the Permanent Commission of the Association).

Secretaries :

R. Schutz, Ingénieur principal au service des Etudes techniques du réseau d'Alsace et de Lorraine.

W. Mac-Lellan, Ingénieur des Ponts et Chaussées (Spain).

P. Arellano, Ingénieur des Ponts et Chaussées (Spain).

K. Pokorny, Reichsbahndirektor, Deutsche Reichsbahn-Gesellschaft.

H. C. King Stephens, Southern Railway (Great-Britain).

SECTION II. — Locomotives and Rolling Stock.

President : Dr. Ing. Wechmann, Reichsbahndirektor, Deutsche Reichsbahn-Gesellschaft.

Vice-Presidents : H. van Manen, Directeur des chemins de fer néerlandais (member of the Permanent Commission of the Association).

R. André, Ingénieur en chef du Matériel et de la Traction de la Compagnie des chemins de fer de Madrid à Saragosse et à Alicante.

M. Weiss, Ingénieur en chef des Chemins de fer fédéraux suisses.

J. de Fontes Ferreira de Mesquita, Directeur général de la Compagnie des Chemins de fer portugais.

Principal Secretary : A. W. Chantrell, Ingénieur principal à la Société Nationale des chemins de fer belges, assistant secretary of the Permanent Commission of the Association.

Secretaries :

L. SANTINI, Ingénieur au Service des Approvisionnements à la Compagnie des chemins de fer de Paris à Lyon et à la Méditerranée.

J. EULATE, Ingénieur du service de la Traction de la Compagnie des Chemins de fer du Nord de l'Espagne.

P. WAGNER, Reichsbahnoberrat, Deutsche Reichsbahn-Gesellschaft.

R. M. D. THRUPP, London and North Eastern Railway.

G. REDER, Ingénieur, Madrid.

SECTION III. — **Working.**

President : LE BESNERAIS, Ingénieur en chef-adjoint de l'Exploitation du chemin de fer du Nord français.

Vice-Presidents : A. L. GIBSON, Continental Traffic Manager, South, London and North Eastern Railway.

P. P. DE ALARCON, Ingénieur en chef de l'Exploitation de la Compagnie des chemins de fer du Nord de l'Espagne.

H. JEZIERSKI, Ingénieur, Conseiller ministériel au Ministère des Communications de Pologne.

Principal Secretary : J. P. VAN RYN, Ingénieur principal à la Société Nationale des chemins de fer belges.

Secretaries :

CHAPERON, Chef-adjoint des services administratifs à la Compagnie du Chemin de fer du Nord français.

A. MORENO, Ingénieur du service de l'Exploitation de la Compagnie des Chemins de fer du Nord de l'Espagne.

J. PUIG, Ingénieur au service du Mouvement du Réseau Catalan de la Compagnie des chemins de fer de Madrid à Saragosse et à Alicante.

M. LEIBBRAND, Reichsbahndirektor, Deutsche Reichsbahn-Gesellschaft.

D. W. ASHWORTH, London Midland and Scottish Railway (Paris Agency).

SECTION IV. — **General.**

President : J. MORENO, Comte de Fontao, Directeur-adjoint de la Compagnie des chemins de fer du Nord de l'Espagne.

Vice-Presidents : S. PRETORIAN, Président du Conseil d'Administration des Chemins de fer de l'Etat roumain.

Sir Walter NUGENT, President, Great Southern Railways (Ireland).

Dr. Ing. B. SCHWARZE, Geheimer Baurat, Reichsbahndirektor, Deutsche Reichsbahn-Gesellschaft.

D. MARKOVITCH, chef du service commercial des chemins de fer de l'Etat yougoslage.

Principal Secretary : E. MINSART, Ingénieur principal à la Société Nationale des chemins de fer belges, assistant secretary of the Permanent Commission of the Association.

Secretaries :

H. ROUSSEAU, Inspecteur divisionnaire à la Direction de la Compagnie du Chemin de fer de Paris à Orléans.

J. PLANAS, Ingénieur attaché à la Direction générale de la Compagnie des chemins de fer de Madrid à Saragosse et à Alicante.

F. REPARAZ, Ingénieur attaché à la Direction de la Compagnie des chemins de fer du Nord de l'Espagne.

Dr. jur. H. ZIETZSCHMANN, Reichsbahndirektor, Deutsche Reichsbahn-Gesellschaft.

J. SAINSBURY, General Manager's office, Great Western Railway (Great-Britain).

SECTION V. — Light railways and Colonial railways.

President : Dr. A. CRISPO, Inspecteur Général des chemins de fer, tramways et automobiles au Ministère des Communications d'Italie.

Vice-Presidents : L. JACOBS, Directeur Général adjoint de la Société Nationale belge des Chemins de fer vicinaux.

Youssef RISGALLAH Bey, Sous-Directeur général des chemins de fer de l'Etat égyptien.

O. LAGASSE, Directeur de la Compagnie des Chemins de fer Catalans.

M. GIMENEZ LOMBARDO, Directeur de la Compagnie des chemins de fer Andalous.

Principal Secretaries : A. ALLARD, Directeur de la Traction et du Matériel à la Société Nationale belge des Chemins de fer vicinaux.

E. HENNIG, Ingénieur à la Société Nationale des Chemins de fer belges.

Secretaries :

J. TAPIA, Ingénieur des Arts et Manufactures, Service de la Traction de la Compagnie des Chemins de fer du Nord de l'Espagne.

C. MORALÈS LAHUERTA, Ingénieur des études et constructions des chemins de fer, Etat espagnol.

Prof. H. BAUMANN, Reichsbahndirektor, Deutsche Reichsbahn-Gesellschaft.

CORNER, London and North Eastern Railway.

BOURREL, Inspecteur à la Société des Transports en commun de la région parisienne.

General interpreter : Dr. A. VELLEMAN.

PROGRAMME OF THE SECTIONAL MEETINGS

Programme of t

—	SECTION I. — WAY AND WORKS.	SECTION II. — LOCOMOTIVES AND ROLLING STOCI
Tuesday 6 May . . . 9 a. m. . 9.30 a. m.	Installation of the section and fixing the programme of procedure. IX. Relations between railways and sea ports. *With section III.*	Installation of the section and fixin the programme of procedure. V. Locomotives of new types; particular, turbine locomotiv and internal combustion mot locomotives.
Wednesday 7 May . . 9.30 a. m.	I. The use of concrete and reinforced concrete on railways. II. Resistance of rails against breakage and to wear.	V. Locomotives of new types; particular, turbine locomotiv and internal combustion mot locomotives. *(Continued).* VI. Improvements in the steam l comotive.
Thursday 8 May . . . 9.30 a. m.	II Resistance of rails against breakage and to wear. *(Continued and end.)*	V. Locomotives of new types; particular, turbine locom tives and internal combu tion motor locomotives. *(Co tinued and end.)* VI. Improvements in the steam l comotive. *(Continued.)* VII. Electric locomotives for ma line traction.
Friday 9 May . . . . 9.30 a. m.	III. Investigation into the static and dynamic stresses in railway bridges.	XI. Signalling of lines for fast traf and in main stations. Da light signals. Automatic blo system. *With section III.*
Saturday 10 May . . . 9.30 a. m.	General meeting.	General meeting.
Monday 12 May . . . 9.30 a. m.	IV. Recent improvements in permanent way tools, and in the scientific organisation of maintenance work.	VI. Improvements in the steam lo motive. *(Continued and end.)* VII. Elctric locomotives for ma line traction. *(Continued.)*
Wednesday 14 May . . 9.30 a. m. 3.30 p. m.	... General meeting.	VII. Electric locomotives for main li traction. *(Continued and end.)* VIII. All steel coaches. Comparis with vehicles built of wood
Thursday 15 May . . 9.30 a. m. 12.30 p. m.	General meeting. Closing ceremony.	General meeting. Closing ceremony.

tional meetings.

SECTION III. — WORKING.	SECTION IV. — GENERAL.	SECTION V. — LIGHT RAILWAYS AND COLONIAL RAILWAYS.
tallation of the section and fixing the programme of procedure. X. Relations between railways and sea ports. *With section I.*	Installation of the section and fixing the programme of procedure. XIV. Use in railway work of machines for simplifying statistical and accountancy work.	Installation of the section and fixing the programme of procedure. XVII. Penetration railways.
XIII. Competition of road transport. *With sections IV and V.*	XIII. Competition of road transport. *With sections III and V.*	XVII. Penetration railways. (*Continued.*) XIII. Competition of road transport. *With sections III and IV.*
X. Methods to be used in marshalling yards to control the speed of vehicles being shunted, and to ensure they travel on to the lines in the various groups of sidings. I. Competition of road transport. (*Continued and end.*) *With sections IV and V.*	XV. Co-operation of the staff towards increased efficiency and its participating in the profits. XIII. Competition of road transport. (*Continued and end.*) *With sections III and V.*	XVII. Penetration railways. (*Continued and end.*) XVIII. Improvements in the permanent way equipment of light railways. XIII. Competition of road transport. (*Continued and end.*) *With sections III and IV.*
I. Signalling of lines for fast traffic and in main stations. Daylight signals. Automatic block system. *With section II.*	XV. Co-operation of the staff towards increased efficiency and its participating in the profits. (*Continued and end.*)	XIX. Electrification of secondary lines.
General meeting.	General meeting.	General meeting.
I. Economical traction methods for use in particular cases. *With section V.* X. Rail motor vehicles. *With section V.*	XVI. Methods followed in training of staff : professional, technical and ordinary working grades.	XII. Economical traction methods for use in particular cases. *With section III.* XX. Rail motor vehicles. *With section III.*
... General meeting.	... General meeting.	... General meeting.
General meeting. Closing ceremony.	General meeting. Closing ceremony.	General meeting. Closing ceremony.

Summary report of the discussions in the sections.

SECTION I.

Way and Works.

President : Sir Charles L. Morgan.

Vice-Presidents : F. Fiori and P. Lévy.

Principal Secretary : R. Despret.

QUESTION I.

The use of concrete and reinforced concrete on railways.

A) Investigation into the respective merits of the different designs of concrete sleeper.

B) Concrete and reinforced concrete buildings.

Preliminary documents.

1st report (Belgium, France, Italy, Portugal, Spain and their Colonies and Switzerland), by Messrs. Jullien and Claise. (See *Bulletin,* October 1929, p. 1959 or separate issue No. 28.)

2nd report (America, the British Empire, China and Japan), by Mr. F. B. Freeman. (See *Bulletin,* May 1929, p. 433 or separate issue No. 1.)

3rd report (other countries), by Mr. E. Krick. (See *Bulletin,* December 1929, p. 2975 or separate issue No. 45.)

Special Reporter : Mr. F. B. Freeman. (See *Bulletin,* May 1930, p. 1353.)

Report of Section I.

(See *Daily Journal of the session,* No. 3, p. 4 and No. 6, p. 2.)

The President opened the meeting. He pointed out that the first question on the Agenda was the use of reinforced concrete on railways.

After the summary of the *Special Reporter,* Mr. Freeman, had been read, the discussion was opened.

Mr. Ribera *(Tangiers to Fez Railway)* called attention to the fact that although the report did not make explicit mention, a great many railway bridges in reinforced concrete had been successfully constructed in Spain, and that the construction was being carried further.

Mr. Müller *(Deutsche Reichsbahn Gesellschaft)* informed the meeting that the

Reichsbahn had made various experiments in reinforced concrete sleepers without attaining any very favourable results. At the present moment the latest trials were being made with asbestos cement insertions which allowed of the coach screws being screwed in direct.

Mr. Jullien *(Paris-Orleans Railway)* objected that the conclusion regarding the insulation of the track was too absolute. He pointed out at the same time that this report had been composed some time ago, and new types of sleeper had since appeared, particularly the Prot sleeper, which is on trial on the Paris-Orleans Railway.

Mr. Quinquet *(Paris-Lyons-Mediterranean Railway)* gave an interesting account of the use of reinforced concrete sleepers on his Company's system. He explained that the two chief difficulties to be overcome were the quality of the ballast and the rail fastenings. He stated that it is desirable to use fine ballast. The same conclusion was arrived at on the Reichsbahn. As regards the fastenings, the problem had not yet been solved.

Mr. von Schrenk *(Erie Railroad)* stated that inconveniences had revealed themselves in America in the types of reinforced concrete sleepers with which experiments had been made. He asked for certain explanations on the results arrived at in Europe, on the Paris-Lyons-Mediterranean Railway, and these were furnished.

Mr. Cambournac *(Reporter)* pointed out that the usual trials with concrete were static trials which could give no real indication as to the resistance of concrete in reinforced concrete sleepers when under dynamic action. Special attention would have to be devoted to the cleanliness of the aggregates. The least trace of clay which prevents adhesion can diminish to a considerable extent the dynamic resistance of concrete.

Mr. Ribera, however, remarked that a small proportion of clay was rather inclined to increase the resistance of concrete. Constructions under the influence of intense vibration and which for ten years had remained in perfect condition left no doubt on this score.

Mr. Coullié *(French Midi Railway)* again observed that the reinforced concrete sleeper must not only be considered from the technical point of view, but also from the economic point of view. In this respect the reinforced concrete sleeper was still very costly.

Finally, on the proposal of the President, the Section adopted the summary below (part *A*).

The Section then proceeded with the examination of the second part of the Question : The use of reinforced concrete for buildings. Several members, Mr. Ribera, Mr. Carpmael *(Great Western Railway, Great Britain)*, Mr. Quinquet and Mr. Ronsse *(Belgian National Railway Company)* called the attention of the Section to the importance of the attacks on reinforced concrete by salt-impregnated air, sea water, the sulphurous smoke of locomotives and other chemical agents.

Mr. de Boulongne *(Paris-Lyons-Mediterranean Railway)* suggested that care must be exercised in the use of special cements.

Mr. Krick *(Reporter)* drew attention to the importance of observation during construction.

Mr. Ferreira *(Portuguese Railway Company)* considered that it would be desir-

able to make systematic observation of rail-carrying bridges in order to note their manner of behaviour under dynamic stresses.

Mr. Cambournac again called attention to the desirability of carrying out experiments in the construction-room in the case of constructions of any magnitude.

The President finally proposed to the Section that the summary part B indicated below should be adopted.

SUMMARY.

« *Part A.* — Considerable progress has « been made in concrete sleeper design. « The detail of rail support and fastenings and the suppression of centre ballast have been given particular study. « The recent installations provide resiliency at the rail support, and at the « same time seem to secure electrical insulation between the rails. The suppression of centre ballasting and elimination of centre solid portion of sleeper have reduced the weight as well as « the cost and also produced a sleeper « better able to withstand shock and vibration.

« The present status of this very important questions appears very encouraging but the problem is by no means « solved. Experiments and study should « be diligently continued, taking into account the prime cost, so that we may « hope to be nearer the final solution at « our next Session.

« It is advisable to undertake systematic tests in the laboratory to investigate the resistance of concrete to dynamic repeated stresses by varying the « nature and size of the aggregate and « its cleanliness.

« *Part B.* — The subject of improvements in methods of concrete making, « better cements and aggregates and better reinforcement is of vital importance « in the general need for stronger and « more durable concrete. These should be « given further study as well as the methods of more accurate proportioning by « control of the water-cement ratio in « order to advance the general knowledge « of this very important building material.

« It will be of interest to follow up « more closely the question of super-cement and other cements of a special « nature.

« Investigations should also be made « into the precautions necessary for « avoiding attacks on the concrete and « the oxidation of the steel in constructions in the neighbourhood of the sea « or which are exposed to chemical action.

« As regards rail-carrying bridges it « would be advisable to place these under « systematic observation with a view to « obtaining sufficiently conclusive details on the manner in which such constructions behave in use and more especially under dynamic stress.

« It is also recommended in the case of « constructions of a certain magnitude « that experiments in the construction-room shall be increased so as to verify « the constancy of the quality of the concrete. »

— The General Meeting held on the 10 May adopted this summary.

QUESTION II.

Resistance of rails against breakage and to wear.

A) First causes of rail breakage; measures taken to reduce the number of breakages, both as regards the way rails are used and the conditions of inspection.

B) Quality of metal used for rails to give normal wear. Conditions governing manufacture and inspection.

Rails : profile and quality, length, weight, and cross section of the rails.

C) Rail joints. The most economical and efficient design.

Preliminary documents.

1st report (America), by Mr. R. B. ABBOTT. (See *Bulletin*, May 1929, p. 483 or separate issue No. 2.)

2nd report (other countries, except the British Empire, China and Japan), by Messrs. CAMBOURNAC and PATTE. (See *Bulletin*, October 1929, p. 2011 or separate issue No. 29.)

3rd report (the British Empire, China and Japan), by Dr. S. MATSUNAWA. (See *Bulletin*, August 1929, p. 1157 or separate issue No. 13.)

Special reporter: Mr. CAMBOURNAC. (See *Bulletin*, May 1930, p. 1362.)

Report of Section I.

(See *Daily Journal of the session*, No. 3, p. 5, No. 4, p. 1 and No. 7, p. 2.)

Meeting on 7 May.

On the invitation of the PRESIDENT, Mr. CAMBOURNAC *(Special Reporter)* read the summary of his special report.

Mr. MATSUNAWA *(Reporter)* also read a note in English on the subject, and this will be inserted in full in the minutes of the Session.

The particular points raised would be referred to during the discussion of the details of the various summaries.

The discussion was at once opened on the first point : The composition of statistics regarding rail breakages.

After an exchange of views between Mr. VAN WAEFELGHEM *(Belgian National Railway Company)*, Mr. CAMBOURNAC and Mr. DRIESSEN *(Netherlands Railways)*, the meeting was adjourned.

Meeting on 8 May.

The PRESIDENT opened the meeting and the Section proceeded to the examination of the special report drawn up by Mr. Cambournac.

After an exchange of views between Messrs. CAMBOURNAC, SANDBERG *(Siamese Government)*, MATSUNAWA, QUINQUET *(Paris-Lyons-Mediterranean Railway)* and DRIESSEN, the Section adopted the first paragraph with this modification, that the appendix to the table of breakages of rails should contain two additional columns giving results which take into account the gradients, whether they are above or below 1 %.

It was also decided in E *a*) of the table to add the words « with or without transverse internal fissures », and under E *b*) to delete the headings « With superficial fissures », and « Without superficial fissures ».

Paragraph 2 was adopted without discusssion.

Paragraph 3 was also adopted after an exchange of views between Messrs. CAMBOURNAC and VAN WAEFELGHEM, with an addition worded as follows :

« Terminate rolling at a temperature as near as possible to that of the critical point. »

Paragraph 4 was adopted without discussion.

As regards paragraph 5, a discussion took place on part *a*).

The Section was divided in its views on the advisability of distinguishing rails of inferior quality, and of specifying the

laying of such rails in a special position, and on a special part of the track.

Nevertheless, after a prolonged exchange of views between Messrs. SANDBERG, VAN WAEFELGHEM and CAMBOURNAC, the Section decided to retain Mr. Cambournac's original wording on the understanding that the French text should be slightly altered as follows :

« Utiliser les rails de tête des lingots. »

Part *b*) was adopted without discussion.

A discussion then took place on part *c*) regarding the inspection of rails in situ by means of apparatus designed for the location of internal defects.

Mr. CAMBOURNAC asked that one of the American delegates should detail the results obtained from the use of the Sperry detector, but as no American was in position to give details, Mr. MÜLLER *(Deutsche Reichsbahn Gesellschaft)* stated that the Reichsbahn had been in touch with the Sperry Co. and that experiments had been made in Germany with the Sperry detector. These had not been satisfactory, as it had been ascertained that the apparatus in question gave no results on a track laid on metal sleepers.

The Reichsbahn had asked Messrs. Siemens Co., of Berlin, to take the matter in hand, and research is proceeding.

Mr. MATSUNAWA stated that the Suzuky detector had been perfected in various ways, and was being used on a fairly large scale in Japan.

Part *c*) was nevertheless adopted without alteration.

A discussion took place on part *d*) relative to the laying down of rails which had undergone heat treatment.

Mr. CAMBOURNAC was in favour of rails being subjected to heat treatment, and stated that the results obtained by the French Nord Railway had been very satisfactory.

Mr. VON WILLICH *(Union of South Africa)* stated, however, that the results attained on the South African Railways by the heat treatment appeared to be contrary to those obtained by Mr. CAMBOURNAC. It should, however, be noted that the rails so treated had a greater carbon content.

Part *d*) was nevertheless adopted without alteration.

The Section then proceeded to the study of paragraph 6 relative to the length of rails.

Mr. MÜLLER made an extremely interesting statement to the meeting regarding the length of rails at present adopted in Germany. He stated that more than 3 000 km. (1 864 miles) of track had actually been laid with rails 30 m. (98 1/2 feet) long, without the least inconvenience resulting, and that experiments were being made with rails of an even greater length. At the present moment a fairly large mileage had been laid with rails 60 m. (197 feet) long, these being formed by welding together two 30-m. rail lengths. Experiments were even being made with rails 120 m. (394 feet) long, and in tunnels with sections of continuous rail of a length of between 500 and 600 m. (1 640 and 1 970 feet). No inconvenience in laying these long rails had as yet been experienced. The only special precaution which had to be taken was to lay the rails at a normal temperature.

Mr. TETTELIN *(French Nord Railway)* desired to be enlightened on two points : firstly, whether the existence of internal stress in the rails did not expose them to the danger of lateral movement of the track, and secondly, he wished to know if the welding was attended with any drawbacks.

Mr. Müller reassured him on these points, and after further discussion on rail lengths and welding between Messrs. Cambournac, Mendizabal *(Madrid-Saragossa-Alicante)*, Zavadil *(Czecho-Slovakian Government)* and Simonsson *(Bergslagen Railway, Sweden)*, the Section approved the wording of paragraph 6 as it had been proposed by Mr. Cambournac.

The Section then passed on to the examination of paragraph 7, which was adopted after some remarks by Messrs. von Willich, Van Waefelghem and Cambournac.

Paragraph 8 was also adopted after some comments by Messrs. Matsunawa, Carpmael *(Great Western Railway, Great Britain)*, Van Waefelghem and Cambournac.

Paragraphs 9, 10, 11 and 12 were adopted without discussion.

Mr. Coullié *(French Midi Railway)* made a very interesting communication on the subject of the adoption of the chevron fish-plate, which has resulted in a considerable reduction in the expenditure incurred for obtaining electric continuity through the rails.

The meeting then closed.

Below will be found the definite summary on Question II.

SUMMARY.

« The various observations and recommendations relative to Question II: *Resistance of rails to breakage and to wear*, may be summarised as follows :

« 1. It is desirable to continue the publication of data relative to rail breakages under the conditions laid down at the London Congress, the tables, however, being slightly modified.

« 2. It is highly desirable to continue the observation and study of rail breakages, and it is recommended that this should be done in collaboration with metallurgical engineers.

« 3 It is desirable that the precautions indicated below should be observed in the manufacture of rails :

« *a*) dose the steel in such a way as to avoid blow-holes;

« *b*) forbid the use of steel scrap at the bottom of the ingot moulds;

« *c*) avoid splashes when pouring;

« *d*) not to roll ingots too hot;

« *e*) not to force the speed when blooming, so as to avoid the formation of cracks;

« *f*) discard from the ingots the part affected by piping and segregation;

« *g*) terminate rolling at a temperature as near as possible to that of the critical point;

« *h*) establish and maintain the profile of the grooves on the rolls with accuracy;

« *i*) reduce to a minimum the cold straightening of rails, so as to diminish the stresses resulting therefrom.

« 4. It is recommended that the following should be developed :

« *b*) elasticity tests for determining the mogeneity of the cross section may be examined. In their present form, these tests can be used for elimination purposes, *i. e.* for the elimination of rails which are not uniform throughout;

« *b*) elasticity tests for determining the degree of fragility of the metal. These tests, in their present form, do not enable fragile rails to be rejected, but they are already sufficient to serve as a basis for the granting of quality premiums. It would be an advantage if

« research could be continued in order « to perfect a fragility test applicable to « the whole cross section of the rail;

« *c*) laboratory research and tests relative to the endurance of rails, *i. e.* to « their resistance to repeated stresses;

« *d*) research and experiments relative « to the stresses which develop in rails under passing wheels.

« 5. The following precautions are recommended when laying rails :

« *a*) to utilise rails obtained from the « head of ingots in those parts of the « line which are least heavily stressed « and to lay them in such a manner that « the wheels first run on to them at the « end farthest from the ingot head;

« *b*) to load and unload rails by mechanical means;

« *c*) to inspect the rails in situ, at least « once a year, on lines where traffic is « intense. It is desirable to perfect appliances for detecting internal defects « in rails whilst in service (Sperry detector, Suzuky defectoscope);

« *d*) to use rails which have received « suitable heat treatment on sections of « line where the rails are subjected to exceptional stresses, to skidding and to repeated braking, as rails so treated resist « the propagation of superficial fissures « (cracks in the running surface) better « than rails which have not been treated.

« 6. The length of medium rails (of « medium weight) can, without inconvenience, be increased to 24 m. (78 ft. « 9 in.), and research and tests should « be continued with a view to increasing « the length beyond 24 metres (if necessary by means of alumnothermic welding), particularly at special points of « the line where the effects of expansion « are less to be feared.

« 7. With a view to reducing normal « wear in rails, it appears desirable to « give the running surface, when new, « the average cross section which it tends « to assume in service.

« 8. With a view to reducing lateral « wear on curves, appliances for lubricating the lateral faces of the head of the « rail and of the wheel tyre which come « into contact during running on curves, « should be perfected and developed, or « special or heat treated steel rails should « be used.

« 9. With a view to reducing wear « through hammerings at gaps in points « and crossings, it is recommended that « use should be made, in the details of « such equipment, of manganese or nickel-chrome steel.

« 10. With a view to remedying wear « due to rusting, it is recommended that « a reinforced cross section be adopted. « The tests with steel containing an admixture (0.3 %) of copper should be « continued.

« 11. It is desirable that all railways « should continue and develop the comparative tests of rail joints suggested « by the London Congress, and that they « should extend these tests to the following two new types of joint :

« — head-free fish-plate;

« — chevron fish-plate.

« 12. It is recommended that each administration should keep statistics relative to the breakage of the different « types of fish-plates used in comparative tests. »

— The General Meeting held on the 10 May adopted this summary except for some alterations in paragraphs 5*a*), 6 and 7 (already included in the above text).

QUESTION III.

Investigation into the static and dynamic stresses in railway bridges.

Preliminary documents.

1st Report (America), by Mr. P. G. Lang, Jr. (See *Bulletin*, May 1929, p. 502 or separate issue No. 3.)

2nd Report (the British Empire, China and Japan), by Sir Henry Fowler and Mr. G. Ellson. (See *Bulletin*, July 1929, p. 859 or separate issue No. 8.)

3rd Report (Belgium, France and their Colonies), by Messrs. A. A. C. Ronsse and R. Despret. (See *Bulletin*, December 1929, p. 3103 or separate issue No. 48.)

4th Report (other countries), by Mr. A. Fava. (See *Bulletin*, December 1929, p. 3129 or separate issue No. 49.)

Special Reporter : Mr. R. Despret. (See *Bulletin*, May 1930, p. 1379.)

Report of Section I.

(See *Daily Journal of the Session*, No. 5, p. 3 and No. 6, p. 2.)

The President opened the session and called upon Mr. Despret, the *Special Reporter* on dynamic and static stresses in railway bridges.

Mr. Despret briefly reviewed the question. He said that in the present state of our experiments and theories it was difficult to choose a definite impact formula. He stated furthermore that what is important is the calculation of the section of a member, and that this section depended on the calculation of stress, including dynamic increase, and upon the working stress allowed. What could be done was to investigate the causes of impact, the elimination of rail joints, reinforcement of the track at the approaches to bridges, the avoidance of flat spots on wheels, and giving careful attention to the balancing of locomotives. The Reporter called special attention to the wheel arrangement; he had brought out in his report the superiority of six-coupled locomotives as compared with four, eight and ten-coupled locomotives. This factor ought to be confirmed by systematic trials. He also pointed out that the calculation of the critical speed and of the speed at which vibration was damped out could give valuable information upon the actual condition of the structure.

Mr. Swain (*East Indian Railway*) pointed out to the meeting that the Indian Railway formula was very similar to the French formula for medium and large spans. For small spans the figures appeared too small, and the impact would be the result of the condition of the track and would not be due to the vehicles themselves.

Mr. Fava (*Reporter*) suggested an addition to the summary dealing with static stresses and in particular secondary stresses.

Mr. Everall (*North Western Railway of India*) supported Mr. Swain and called particular attention to the dynamic stresses in girders of short span, and in the details of the flooring. Tests carried out in Switzerland had demonstrated that the stresses due to completely balanced electric locomotives were equal in value to those shewn by steam locomotives. The conclusion must be drawn that there is some other factor independent of the vehicles which causes these dynamic stresses.

Mr. Fraser (*London & North Eastern Railway*) stated that he had been one of the members of the first Commission on Impact in Great Britain. Experiments he had carried out with the Fereday-Palmer

apparatus had demonstrated the measured stresses were as a general rule lower than calculated stresses. More particularly in the component parts of a bridge there is a widespread division of the load amongst the successive elements which diminishes the stress on an isolated element.

Sir Henry Fowler (*Reporter*) stated that, having as a Mechanical Engineer been in the English Bridge Stress Committee, he could say that the principal result of the investigations had been to allow of the increase of the axle loading. He would like our American colleagues to explain how they are able to run on the American railways locomotives with two outside cylinders. The English Commission has clearly shewn that to lower the hammerblow it is desirable to build locomotives with three or four cylinders. He could not share Mr. Desprets' opinion as regards the freedom from objectionable features of the six-coupled locomotives. His opinion was that eight and ten-coupled wheel locomotives should be as good. He added that he took particular care to avoid flat spots on the wheels.

It was also desirable that the mechanical engineer should do everything possible to diminish the weight of the reciprocating parts, and with this object it was desirable to use special steel.

He reminded the meeting that the English Committee had been assisted by Professor Inglis, of Cambridge, who had shewn the importance of the springs upon the dynamic stresses on the bridge. The Committee had also brought out the importance of rolling and pitching.

Sir Henry Fowler ended his remarks by calling attention to the value of continuing experiments and giving them an international character.

Mr. Newlands (*London Midland and Scottish Railway*) said that he did not share the optimism of Sir Henry Fowler regarding the inoffensive nature of present-day locomotives in the matter of dynamic effects. He contended that these effects depended less on the track than on the locomotives. Interesting experiments were now in course of being made in registering the « parasitic » movements of the locomotive by means of a cinematographic camera.

Mr. de Boulongne (*Paris-Lyons-Mediterranean*) remarked that his Company in order to avoid dynamic effects prefers to lay its bridge track on ballast, and to construct the flooring of girders covered with concrete.

The President proposed putting the summaries to the vote, and that the Section should first of all give its opinion on the addition proposed by Mr. Fava and supported by Mr. Lévy (*French State Railways*) regarding static stresses on bridges.

The Section was of opinion that a summary should be added to those already proposed.

The Section also agreed to a supplementary summary proposed by Mr. Swain on the subject of the desirability of establishing a single formula destined to determine the impact allowance in terms of the span in metres or in feet.

Finally, the Section adopted the following summary :

SUMMARY.

« 1. It is desirable that the railway « companies should continue experi- « ments and the study of secondary « stresses, with a view to furnishing « supplementary information on the « occasion of another Railway Congress.

« 2. The advantages of eventually establishing and adopting a definite formula for the impact allowance in terms of the span in metres (in feet) are that it would assist greatly in the standardisation of bridge work.

« 3. Care should be taken that the treads of the wheel tyres are regular — flats capable of serious damage should be avoided.

« 4. Particular care should be paid to the upkeep of the track on the bridge floor and at the approaches.

« Care should be taken that the joints of the rails are kept in order — if possible they should be placed off the bridge, at all events as close as possible to the supports. The trials of welding the joints on bridges will be followed with interest, this measure, if successful, being extremely favourable to the reduction of impact.

« It is also advisable to strengthen the sections of the track at the approaches to bridges, so as to avoid rapid variations of the equilibrium of the locomotive on its springs.

« 5. The influence of the excess counterbalance weights of locomotives should be diminished by distributing the weights between groups of three adjacent coupled axles. »

— This summary was adopted by the General Meeting held on the 10 May.

QUESTION IV.

Recent improvements in permanent way tools, and in the scientific organisation of maintenance work.

Preliminary documents.

1st Report (Belgium, France, Italy, Portugal, Spain and their Colonies), by Mr. D. MENDIZABAL. (See *Bulletin*, January 1930, p. 9 or separate issue No. 51.)

2nd Report (America, the British Empirie China and Japan), by Mr. Ch. H. J. DRIESSEN. (See *Bulletin*, February 1930, p. 385 or separate issue No. 58.)

3rd Report (other countries, except Germany), by Mr. J. HAUER. (See *Bulletin*, March 1930, p. 1029 or separate issue No. 70.)

4th Report (Germany), by Dr. Ing. MÜLLER. (See *Bulletin*, March 1930, p. 1079 or separate issue No. 71.)

Special Reporter : Mr. Ch. H. J. DRIESSEN. (See *Bulletin*, May 1930, p. 1556.)

Report of Section I.

(See *Daily Journal of the Session*, No. 7, p. 1 and No. 9, p. 4.)

Meeting on 12 May 1930.

The President, Sir Charles MORGAN, opened the meeting and reminded the members that Mr. TETTELIN was showing, in the afternoon, a film dealing with mechanical laying of complete sections of track.

The general question of improvements in permanent way equipment and the scientific organisation of maintenance work was then discussed.

After an interesting exchange of views between Messrs. DRIESSEN (*Special Reporter*), TETTELIN (*French Nord*), QUINQUET, RUFFIEUX (*Paris-Lyons-Meditterranean*), MÜLLER (*Reporter*), MENDIZABAL (*Reporter*), ZAVADJIL (*Jugoslav State*), PONTICELLI (*Italian State*) and LEMAIRE (*Belgian National Railway Company*), the larger number of the summaries were accepted either without alteration or with the modifications shewn in the text below.

Summaries Nos. 6, 12 and 17 were deleted.

As regards Summary No. 14 proposed by Mr. Driessen, several delegates were also of the opinion that the subject of permanent way equipment did not come under the question under consideration.

Mr. Tettelin gave a particularly interesting account of the function of steel bearing plates in conjunction with Vignoles rails. After this matter had been fully discussed, the meeting decided to retain the summary as printed hereafter.

The summary adopted by the Section is worded as follows :

SUMMARY.

« 1. The track work which is usually « done with special equipment (apart « from the use of small tools like jacks, « poneycars, etc.) is :

« *a*) Unloading the ballast by means « of special wagons;

« *b*) Tamping the ballast by means of « pneumatic or electric tampers;

« *c*) Weeding the ballast by chemical « means.

« 2. Track work for which mechanical « tools deserve to be considered is :

« *a*) Unloading rails and re-loading « rails and permanent way material;

« *b*) The mechanical compression of « the bottom ballast;

« *c*) Laying of complete sections of « track;

« *d*) Oiling the running side of rails « on curves;

« *e*) Driving coach screws and possi- « bly tightening fish-plate bolt nuts, me- « chanically.

« 3. Apart from cranes which are « usually driven by a steam engine or « Diesel or internal combustion motor, « both pneumatic and electric machines « meet all needs.

« 4. The economic advantages are in « several cases very appreciable and show « savings of as much as 50 %. In order « to get a satisfactory output from the « machines, it is necessary to regulate « strictly their use by drawing up a « programme of work.

« 5. Apart from economy, the use of « machines can lead to other advantages « such as better work, less fatigue for « the workmen, work carried out in shor- « ter time, and the possibility of making « up for a shortage of labour.

« 6. In the organisation for maintain- « ing the track, several innovations have « been introduced with a view to econo- « my. The chief innovations are : the « extension of maintenance by general « revision; reducing the strength of the « gangs in winter; increasing the area co- « vered by the gangs; the employment of « auto-cars for transporting men, stores, « and mechanical tool equipment.

« 7. The length of the road to be main- « tained by a brigade and the strength of « the brigades differ within wide limits. « A rational basis for determining the « number of men required for mainte- « nance is the length of equivalent track, « which is to be calculated by means of « formulæ. It is necessary to introduce « into these formulæ all the factors bear- « ing on the maintenance, giving them « their appropriate coefficients.

« 8. Maintenance by general revision is « to be recommended, not only as an eco- « nomic measure, but also in order to « have an effective control of the person-

« nel entrusted with the maintenance of « the road.

« 9. There are only a very few Administrations who have certain work carried out by their personnel by piece « work, or who grant premiums for the « execution of certain work within a « fixed period. Nevertheless, this practice deserves attention, as much from « the economic point of view as in the « interest of the workmen, the fear that « the quality of the work will suffer, not « being justified.

« 10. The 8-hour day (48 hours per « week), or a period which does not materially depart therefrom is fairly general. Often in summer the day is longer, but in winter shorter, than the normal day.

« 11. Generally the working time begins « to count from the moment when the « workman arrives at the designated « spot, either the gang depot or a station, « or the place where the work has to be « done.

« 12. The use of auto-cars to take men « to their work is not very general, and « is only indicated where work is started « habitually at a place other than at which « the men are concentrated.

« 13. In order to increase the life of « the materials used, the following measures should be adopted : heavy rails, « special steels for rails and points, hard « wood sleepers, heavy base plates, broken hard stone for ballast, increasing « the number of sleepers, lubricating the « fish-plates and the running side of the « rails on curves, repairing worn parts « and subsequently using them again.

« 14. The use of graphs shewing the « progress of all works, with the indication of the economic results obtained « is not very general. These graphs « should be used increasingly but they « should be of the simplest possible « form. »

— The General Meeting ratified this summary on the 14 May.

SECTION II.

Locomotives and Rolling Stock.

President : Dr. Ing. WECHMANN.

Vice-Presidents : H. VAN MANEN, R. ANDRÉ, M. WEISS and J. DE FONTES FERREIRA DE MESQUITA.

Principal Secretary : A. W. CHANTRELL.

QUESTION V.

Locomotives of new types; in particular, turbine locomotives and internal combustion motor locomotives.

Construction, efficiency, use and repair.

1st Report (Belgium, France, Italy, Portugal, Spain and their Colonies), by Mr. COSSART. (See *Bulletin*, November 1929, p. 2397 or separate issue No. 35.)

2nd Report (British Empire, China and Japan), by Mr. R. E. L. MAUNSELL. (See *Bulletin*, September 1929, p. 1563 or separate issue No. 19.)

3rd Report (other countries, except America), by Mr. P. KOLLER. (See *Bulletin*, April 1930, p. 1259 or separate issue No. 74.)

4th Report (America), by Mr. A. LIPETZ. (See *Bulletin*, March 1930, p. 863, or separate issue No. 67).

5th Report (Germany), by Prof. H. NORDMANN. (See *Bulletin*, January 1930, p. 259, or separate issue No. 56.)

Special Reporter : Mr. P. KOLLER. (See *Bulletin*, May 1930, p. 1383.)

Report of Section II.

(See *Daily Journal of the Session*, No. 2, p. 5, No. 3, p. 5, No. 4, p. 3, No. 6, p. 2, No. 7, p. 2 and No. 9, p. 4.)

Meeting held on 6 May.

THE PRESIDENT called upon Mr. KOLLER, Special Reporter on Question V. Mr. KOLLER thereupon read a summary of the reports of Messrs. COSSART, MAUNSELL, KOLLER, LIPETZ, and NORDMANN. THE PRESIDENT then tanked Mr. KOLLER for his summary, which allowed him to put the question under two headings, viz. :

1. Steam locomotives;
2. Internal combustion locomotives.

He opened the discussion on steam locomotives of new types, stating that the principal motive was to increase the difference in pressures, either by reducing the final pressure, *i. e.* locomotives with condensors, or increasing the initial pressure, *i. e.*, high pressure locomotives.

Mr. NORDMANN (*Reporter*) stated that the main point regarding turbine locomotives consisted in reducing the amount of steam used by the auxiliary apparatus. Thus, under the best running conditions,

a turbine locomotive consumes 40 % less than an ordinary locomotive of the Stephenson type. Under express running conditions this figure falls to 20 %. Finally the turbine locomotive had several very interesting features, notably easy starting. The riding of the locomotive is even, in view of the absence of alternating forces, all these points being much appreciated by the personnel.

Sir Henry Fowler (*London, Midland & Scottish Railway*) stated that the experience on the London Midland and Scottish Railway with one locomotive of the Ljungström type, had not raised any difficulties in principle; the only difficulties which had arisen were in respect to minor details. One of the important questions was the first cost, and he did not feel any appreciable economy would finally be realised.

Mr. Onoe (*Japanese Government Railways*) asked what was the price of a turbine locomotive with a condensor, compared to that of a turbine locomotive without a condensor, and what would be the coal economy realised in the former case ?

Mr. Nordmann had no figures on this subject, and it seemed to him that the question did not arise, as the condensor ought to be considered a necessary adjunct.

Mr. Bals (*Rumanian State Railways*) stated that on the Ljungström turbine locomotive the engine was at the back and he asked if it would not be possible to put the boiler at the back and the engine at the front.

Mr. Koller replied that this arrangement could not be adopted without certain difficulties, but he drew attention to the fact that with this arrangement no inconvenience had been met with in Sweden at speeds of 80 km. (50 miles) per hour.

Then followed an exchange of views between Mr. Bianchi (*Italian State*), Mr. Koller and Mr. Wagner (*Deutsche Reichsbahn Gesellschaft*), on the principle of condensors for turbine locomotives.

Mr. Bals asked if there was any automatic adjustment for the draft on the fire in existence, and Mr. Nordmann replied in the affirmative.

The President next passed to the discussion on high pressure locomotives.

Mr. Nordmann drew attention to the facts in his report on the Schmidt-Henschel locomotive, and in conclusion expressed the idea that the future locomotive would be exclusively a high pressure locomotive, conveniently equipped for pre-heating and prevention of scale in the feed water, as well as being equipped for superheat.

Mr. Bals was very anxious to know what the maintenance cost of the fire-box on the Schmidt-Henschel locomotive was.

Mr. Nordmann stated that the difficulties which had been experienced with the « Brotan » type of fire-box had not arisen on the high pressure locomotive of the Deutsche Reichsbahn, as the circulating water in the closed circuit was entirely distilled water.

Meeting held on 7 May 1930.

The President opened the meeting by recording the views expressed by Mr. Nordmann on high pressure locomotives of the future.

Mr. Koller stated that the Winterthur locomotive fulfilled these conditions.

They had carried out trials in Austria, and in France with it, and in Austria had obtained a coal economy of about 30 %.

Mr. RENEVEY (*Paris-Lyons-Mediterranean, Algerian Lines*) stated that the trials carried out in France on the Est Railway, utilising a fixed cut-off, constant speed, and a brake-locomotive, had shown that the steam production was insufficient. They had therefore equipped the locomotive with à « Kylälä » blast pipe, and the results obtained had been better.

Mr. WAGNER was of the same opinion as Mr. RENEVEY, and considered that this locomotive was a particularly interesting solution to the problem.

Mr. WEISS (*Swiss Federal Railways*) stated that he had carried out trials with a Winterthur locomotive in regular service, and had obtained a coal economy of 30 %. He had not encountered any difficulties with regard to the principles on which the engine was designed.

Mr. GRESLEY (*London & North Eastern Railway*) gave certain information concerning the high pressure locomotive on the London & North Eastern Railway. He stated that simplicity of design of this locomotive had been one of the chief points. The pressure had therefore been limited to 450 lb., and particular care had been taken to reduce the heat losses by radiation.

THE PRESIDENT then passed on to the question of internal combustion locomotives, and remarked that the method of transmission was one of the essential matters.

Sir Henry FOWLER stated that electric transmission was undoubtedly the best, but it was also the most costly, from the point of view of first cost. Under working conditions, however, it did not always give sufficient economic results.

THE PRESIDENT drew attention to the fact that electrical transmission meant increase in weight.

Then followed a discussion between Messrs. NORDMANN, REDER (*Secretary*), MUNCK (*Danish State*), STALDER (*Swiss Government*), BALS and GRESLEY, regarding the maintenance costs of the various types of transmission, and the importance of daily mileage.

Mr. DEBIZE (*Compagnie fermière des Chemins de fer tunisiens*) stated that very satisfactory results had been obtained with mechanical transmission. In answer to a question by Mr. WAGNER, he replied that he was talking about low power locomotives (125 to 250 H. P.).

Mr. WAGNER then said that at these horse powers mechanical transmission is by far the most simple and the most economical, but when one came to 400 and 500 H. P. which was the horse power demanded for ordinary locomotives, these advantages disappeared on account of the large number of gears necessary, and at the same time owing to the increase in weight.

THE PRESIDENT then talked about the summary arrived at by Mr. KOLLER. A discussion arose over the wording of the 3rd paragraph, concerning the creation of an international testing plant for locomotives.

Mr. NORDMANN doubted the usefulness of a testing plant of this nature. It appeared to him to be more useful to standardise the conditions under which the tests took place.

Messrs. GRESLEY, RENEVEY and ANDRÉ (*Vice-President*) were of the same opi-

nion that it was necessary that each country should put down at least one testing plant.

THE PRESIDENT then went over the points raised, and proposed to appoint a Sub-Committee to arrive at a definite wording of the summary for Question V, which would be given at the next meeting.

The Section approved this proposal, and appointed Messrs KOLLER, GRESLEY, RENEVEY, and WAGNER.

This Sub-Committee put forward the following text :

SUMMARY.

« The Congress recommends to the « Railway Companies and Administra- « tions present :

« 1. To encourage efforts to create new « types of locomotives and to improve the « current Stephenson type of locomotive « by facilitating in particular the initia- « tive of locomotive builders;

« 2. To develop further in particular « the use of extra-high steam pressures « and of the internal combustion locomo- « tive;

« 3. To carry out methodically trials of « locomotives of new types and different « designs built by various makers and to « publish the results of such trials syste- « matically and as made;

« 4. To co-operate with a view to the « erection of locomotive experimental sta- « tions : the international collaboration « of such stations would facilitate pro- « gress in scientific locomotive design. »

These conclusions were unanimously adopted.

— The Section, after discussion of Question VI, decided that the above summary would also apply to Question VI.

— It was approved by the General Meeting held on the 10 May.

QUESTION VI.

Improvements in the steam locomotive.

Increased pressures and higher superheats. Improvements in the design of superheaters and parts connected with superheating. Feed water heating and air preheating. Improvement of valve gears.

Preliminary documents.

1st Report (France, Italy, Portugal, Spain and their Colonies), by Mr. PARMANTIER. (See *Bulletin*, September 1929, p. 1573 or separate issue No. 20.)

2nd Report (other countries, except America, the British Empire, China, Japan and Germany), by Mr. Th. BALS. (See *Bulletin*, November 1929, p. 2421 or separate issue No. 36.)

3rd Report (America), by Mr. W. L. LENTZ. (See *Bulletin*, October 1929, p. 2113 or separate issue No. 30.)

4th Report (British Empire, China and Japan), by Mr. H. N. GRESLEY. (See *Bulletin*, November 1929, p. 2689 or separate issue No. 41.)

5th Report (Germany), by Mr. R. P. WAGNER. (See *Bulletin*, January 1930, p. 99 or separate issue No. 52.)

Special Reporter : Mr. R. P. WAGNER. (See *Bulletin*, May 1930, p. 1391.)

Report of Section II.

(See *Daily Journal of the Session*, No. 3, p. 5, No. 4, p. 3, No. 6, p. 2, No. 7, p. 2 and No. 9, p. 4.)

The President asked Mr. Wagner (*Special Reporter*) to give a very short *résumé* of his special report on question VI.

There was no discussion on Chapter I (Increase of steam pressure), or Chapter II (Steam superheating).

On Chapter III (Pre-heating of feed water) Sir Henry Fowler (*London Midland & Scottish Railway*) stated that he had obtained particularly satisfactory results on his Company's system, with exhaust steam injectors, and the fitting of them had been made standard for future locomotives.

Mr. Parmantier (*Reporter*) stated that the Paris-Lyons-Mediterranean had not been able to obtain more than 4 % economy with exhaust steam injectors. Sir Henry Fowler said they had gained 7 %, and Mr. Bianchi (*Italian State*), 3 %.

Mr. Wagner and Mr. Bals (*Reporter*) remarked that the result depended upon the pressure of the exhaust steam, and also on the boiler pressure.

Referring to Chapter V (Valve gears), Mr. Bianchi, Sir Henry Fowler, and Mr. Flobert (*North of Spain*) stated that satisfactory results had been obtained with the Caprotti system of poppet valve.

Mr. Parmantier, during the discussion on Chapter VI (Draught and steam exhaust) insisted on the importance which the Paris-Lyons-Mediterranean attached to fitting a variable blast pipe.

Mr. Bals said that when enginemen were not very expert, he preferred a blast pipe of the fixed top type.

The Section decided that the summary relative to Question V would also apply to Question VI, after being supplemented as follows with regard to steam reciprocating locomotives :

ADDITIONAL SUMMARY.

« Among the recent improvements « which have taken place in steam locomotives of normal construction, special « attention should be given to :

« *a*) Increase in the temperature of « superheat, and

« *b*) The pre-heating of the feed water.

« Taking into account the numerous « trials which have been carried out by « many of the Railway Companies, and « the experiences gained over many years, « this Congress is of the opinion that :

« *a*) The temperature of superheat can, « in practice, be taken to 400° C. (752° « F.), special attention being given to lu« brication and the method of steam dis« tribution;

« *b*) That there are in service methods « for pre-heating of water which are giv« ing satisfaction.

« The Congress recommends the adop« tion of these two improvements on « account of the important economies « which can be realised from them. »

— This summary was ratified by the General Meeting held on the 14 May.

QUESTION VII.

Electric locomotives for main line traction.

a) passenger locomotives; *b)* goods locomotives; *c*) locomotives for mountainous country. Multiple-unit traction.

Preliminary documents.

1st Report (France and Colonies), by Messrs. de Boysson and Leboucher. (See

Bulletin, September 1929, p. 1733 or separate issue No. 22.)

2nd Report (America), by Mr. J. V. B. Duer. (See *Bulletin*, July 1929, p. 887 or separate issue No. 9.)

3rd Report (British Empire, China and Japan), by Dr. K. Asakura and Dr. H. Imaidzumi. (See *Bulletin*, September 1929, p. 1681 or separate issue No. 21.)

4th Report (other countries, except Germany), by Mr. G. Bianghi. (See *Bulletin*, December 1929, p. 2997 or separate issue No. 46.)

5th Report (Germany), by Dr.-Ing. W. Wechmann. (See *Bulletin*, April 1930, p. 1309 or separate issue No. 75.)

Special Reporter : Mr. G. Bianchi. (See *Bulletin*, May 1930, p. 1410.)

Report of Section II.

(See *Daily Journal of the Session*, No. 4, p. 3, No. 7, p. 2, No. 9, p. 3 and No. 10, p. 2.)

Meeting held on 9 May.

Mr. Wechmann (*President* and *Reporter* on Question VII) opened the discussion on this question and called upon Mr. Bianchi (*Special Reporter*) to make resumé, chapter by chapter, of the special report he prepared on this subject.

Mr. Bianchi thereupon read paragraphs 1 and 2 of the resumé of his special report.

The President concluded from this resumé, that the most interesting question was that appertaining to motors supported by the nose, which was the usual method, according to the reports, employed for speeds up to 80 km. (50 miles) per hour.

Mr. Leboucher (*Reporter*) stated that in France nearly 85 % of the motors are supported by the nose, and frequently attained speeds of 90 to 95 km. (56 to 59 miles) per hour. On the Paris-Orleans, trials have been carried out at speeds between 105 and 110 km. (65 and 68 miles) per hour. The weight of the motors was about 4 to 5 tons.

Mr. Leboucher asked for information about motors of this sort, which have been constructed in Germany, and whose weight was from 5 to 6 tons.

The President replied that, in addition to numerous goods locomotives for speeds up to 65 km. (40 miles) per hour, two express *single-phase* locomotives had been equipped with motors of this type. Each motor weighed 4 800 kgr. (10 560 lb.); the weight could be reduced by using a steel plate motor casing instead of one of cast iron. The standard power was 525 kw. at 1 600 revolutions per minute, which corresponded to a speed of 112 km. (70 miles) per hour. The unsprung weight was 5 1/4 tons, roughly the same as that on a steam locomotive.

Mr. Bianchi asked whether in Japan and the United States unfavourable reports had not been made about motors supported by the nose.

Mr. Onoe (*Japanese Government Railways*) could only refer to the replies given to the questionnaire.

Mr. Bianchi stated that great progress would be made if locomotives could be constructed with motors supported by the nose, and which could travel at 110 km. (68 miles) per hour. Trials made with the driving gear with and without springs, with weights of 15 tons per axle

had shown that springs were not indispensable.

Mr. Leboucher said that experience on the French Railways confirmed the above opinion in all cases.

The President could not give any information regarding gear wheels without springs, because in Germany express locomotives with 20 tons per axle had been fitted with springs.

Mr. Weiss (*Swiss Federal Railways*) drew attention to the importance of the question of the state of the road. He thought that on the North of Spain Railways broken axles had been found.

Mr. Eulate (*North of Spain Railways*) stated that the broken axles had been on the leading and trailing wheels of locomotives of the type C + C, and he thought that this might be attributed to the fact that the leading axle was a driving axle.

Mr. Bianchi then read paragraph 3 concerning trucks and motor cases.

Mr. Leboucher stated that the French Railways as a whole had arrived at two satisfactory solutions of this question. The Paris-Orleans used independent bogies, the frame carrying the draw gear, the Midi using two carrying bogies on which the draw gear was placed. A special arrangement limited the lateral movement at high speeds.

Mr. Bianchi stated that on the locomotives B + B + B, the three bogies are coupled together; this arrangement had given satisfaction.

The President stated that with high powered locomotives one could not very well avoid having an articulated frame. The results had not, however, been very satisfactory, the riding was not steady, and the upkeep was costly; the rigid type of frame was preferred at the present time.

Mr. Bals (*Rumanian State Railways*) asked wheter special arrangements for avoiding lateral movement were employed. He thought that certain Railway Companies had made use of an unsymmetrical wheel arrangement in order to lessen the disturbing forces.

Mr. Weiss stated that the Swiss Federal Railways possessed locomotives of the types 1B + B1 and 1B1 + B1, but in regard to the latter, it was entirely a case of the distribution of weight which had decided the adoption of the unsymmetrical arrangement. In order to avoid unusual wear on flanges, they had made use of a transverse coupling between the two bogies. In a further case, the lateral movement had been suppressed by means of a friction damper arrangement between the bogie and the frame.

Mr. Japiot (*Paris-Lyons-Mediterranean Railway*) was of the same opinion as Mr. Weiss.

Mr. Bianchi then read paragraph 4 concerning the question of axle weights relative to the behaviour of the locomotive on the track.

Mr. Leboucher stated that electric locomotives caused less fatigue to the track than steam locomotives, in which it was not possible to balance the alternating masses, but nevertheless the gearless type of locomotive had a bad name from this point of view. The fatigue of the track did not seem to be due, however, to the position of the centre of gravity, but rather that the axle formed too rigid a mass. Questioned by the President, Mr. Leboucher stated that on the Paris-

Orleans the speed stipulated for a gearless locomotives was 120 km. (75 miles) per hour, but at 100 km. (62 miles) per hour the movement became so unsteady that radical modifications had been necessary.

Mr. Bianchi regretted that the absence of the American engineers prevented them from elucidating this question. He thought, however, that the tendency was to abandon the gearless type.

He thereupon read paragraph 5 concerning the question of the factor of adhesion.

Mr. Bals asked whether it was possible to make use of the high tractive effort of electric locomotives in view of the non-strengthened draw gear of existing rolling stock.

Mr. Bianchi replied that the tractive efforts which were possible, were never made use of.

Mr. Bals asked whether there was not in existence any arrangement which automatically limited the tractive effort, and Mr. Bianchi replied that an arrangement of this sort had existed, but had been done away with. The driver should be capable of using his own discretion.

Mr. Leboucher thought it would be very interesting to study the law of the variation of the adhesion factor as a function of the speed. He drew attention to the researches which had been made in Switzerland on this subject.

Mr. Weiss was unable to give any information on this subject, the researches having been carried out by an engineer attached to a private firm. The variation of the adhesion factor depended upon the system of transmission, movement, method of coupling, motors, as well as the type of current available. It was thought that in order to get better adhesion, the system of cranks would be preferable, but they found out by experience that locomotives of the Westinghouse system were no more subject to slipping than locomotives with cranks. On the other hand, motors in parallel were more subject to slipping.

The President confirmed these statements, and Mr. Bianchi stated that with 3 000-volt D. C. motors, the motors should always be coupled in series. He recalled that the steam locomotive had more tendency to slip than electric locomotives with cranks, since the driving couple of the former is less constant.

Meeting held on 12 May.

Mr. Bianchi read out the résumé of his special report on the electrical part of locomotives, paragraph 6.

Mr. Eulate stated that the two types of pantograph used on the North of Spain Railways had given satisfaction. The type which is raised by springs is quicker in action, but affords less security to the personnel.

Mr. Leboucher confirmed this, but he preferred the method which raised the pantograph by springs. He thought that difficulties of this type could be surmounted by the use of double locking.

Mr. Cortez Leigh *(London Midland & Scottish Railway)* preferred a pantograph which is raised by compressed air, on account of the greater security.

Mr. Cuttica *(Italian State Railways)* wanted to know the time taken in practice for the raising and dropping of pantographs for these two types.

Mr. van Lessen *(Netherlands State Railways)* said he had carried out trials in Holland which had have led him to prefer a pantograph raised by compressed air.

Mr. Cardon *(Paris-Orleans Railway)* stated that the time taken to drop a pantograph of the compressed air type was 8 to 10 seconds, and that was when the top of the pantograph had been made heavier.

Mr. Weiss stated that on the Swiss Federal Railways pantographs raised by compressed air were used, and that the dropping had been accelerated by the use of exhaust valves. The time taken to drop the pantograph was from 5 to 7 seconds.

Mr. Leboucher in answer to a question of Mr. André *(Madrid-Saragossa-Alicante Railways)*, stated that the Midi had made certain alterations to their pantograph in order to overcome the effects of « aeroplaning ».

Mr. Bianchi then gave some information on the effect of wind on a locomotive fitted with two pantographs.

The President said the Reichsbahn had adopted the pantograph raised by compressed air, and it was so satisfied with this system that it had not carried out any further researches into the question.

Mr. Bianchi then read paragraph 7 which did not produce any discussion and following that, paragraph 8.

The President asked :

1. If any explosions had occurred with oil circuit breakers, and what had been the results, and

2. How could these explosions be avoided and had any circuit breakers been designed which worked without oil ?

Mr. Bianchi gave some information on this subject.

Mr. Cortez Leigh asked if the causes of these explosions had been determined, and were not the costs for maintenance of circuit breakers, working without oil, very high ?

The President said the circuit breaker without oil was only an experiment. Certain explosions had arisen with oil circuit breakers, but without any destructive effects.

The question then arose whether the circuit breaker ought to function immediately in the case of a short circuit or whether the feeder current should be interrupted first of all.

Mr. Weiss said that on the Swiss Federal Railways, circuit breakers of 100 000 K.-V.-A. were in use, *i. e.* which were 30 times the power of the locomotive. A relay avoided the working of the circuit breaker of the locomotive, and opened the nearest section circuit breaker.

Mr. Öfverholm *(Swedish State Railways)* said that in Sweden the circuit breaker with oil opened automatically up to 200 amperes; for a higher current a special arrangement caused the circuit breaker to open in the sub-station.

In reply to a question of Mr. van Lessen, Mr. Weiss stated that the relay system about which he had spoken was in current use on the Swiss Federal Railways.

Mr. Bianchi recalled that up to now one had only spoken about alternating current locomotives. He stated that for continuous current locomotives, two sys-

tems of circuit breakers were in existence :

1. Ultra-rapid circuit breakers and

2. Ordinary circuit breakers, which did not function until after the starting resistances had been put in.

Mr. Eulate stated that ultra-rapid circuit breakers gave satisfaction but the maintenance was costly.

Mr. Leboucher stated that trials with ultra-rapid circuit breakers, cutting out in a thousandth of a second had been made.

Mr. van Lessen stated that the difficulty rather came from the pressure of the current.

Mr. Bianchi then made a distinction between the circuit breaker which functioned after a « surge » current, and that following the duration of a high current.

Mr. Japiot said that the American circuit breaker could also be regulated for the latter way. It was regulated to function on « surge » current for substations, and for duration current on the locomotives.

Mr. Bianchi then read paragraph 9 of his summary, and it was only necessary to examine the question of equipment for single phase current.

Mr. Weiss said that in Switzerland electro-pneumatic contacts were used, as well as the Brown Boveri contacts. Both systems had given good results.

The President enumerated the various types of contacts used on the German Railways and stated that each one had its advantages and disadvantages.

Mr. Bianchi then read point 10 of his summary.

Mr. Leboucher proposed that they should be in favour of thorough insulation.

Mr. Cortez Leigh agreed with this.

The builders had offered to make improvements, but we should insist on further improvements.

Mr. Bianchi then dealt with point 11.

The President, Messrs. Bianchi and Cortez Leigh, gave information on the regulations adopted on this subject in Germany, Italy and England.

Point 12 of Mr. Bianchi's summary did not produce any discussion.

Mr. Bianchi than read paragraph 13 on regeneration of energy.

Mr. Weiss, in answer to Mr. Bals, said that the Swiss Federal Railways used this system for monophase locomotives on heavy gradients.

The President drew attention to the information given in his report on this subject.

Mr. Hinglais *(Compagnie du Chemin de fer du Maroc)* stated that, in answer to a question by Mr. Bianchi, in Morocco electrical braking had been raised up to 50 %, on account of the very special working conditions which existed, the tonnage hauled up the incline being 750 tons, whereas that which descended was 2 100 tons.

Mr. Bianchi then read point 14 of his summary (« dead man's » device).

Mr. Weiss gave some information on the two systems in use in Switzerland.

Mr. van Lessen said in Holland a pedal was also in use.

Mr. Weiss said that this system was also in use in Switzerland.

The President drew attention to a description of the three types which were in use in Germany and were described in his report.

Mr. Cuttica described an arrangement of a lever with an alternating movement which stopped the driver from locking his driving gear, when driving the train.

Mr. Bianchi considered that arrangements of this nature were too cumbersome for the personnel, and stated that in Italy, on the contrary, they were studying an automatic arrangement based on the centre of gravity of the driver.

Point 15 did not raise any discussion.

Mr. Bianchi then read the summary concerning the mechanical part of the electric locomotive, and this gave rise to various observations, and it was decided that they should be put in order by a Sub-Committee composed of Mr. Bianchi, as President, Mr. Leboucher, Sir Henry Fowler *(London Midland & Scottish Railway)* and Mr. Nordmann *(Deutsche Reichsbahn Gesellschaft)*.

Meeting held on 14 May.

The President opened the Meeting by reading the summaries arrived at for Question VII.

SUMMARY.

« 1. The Congress finds in the first « place that the electric locomotive does « not present the similarity of arrange- « ment that the steam locomotive already « had a few years after its invention and « in which direction it has since con- « tinued.

« 2. The different methods adopted for « the transmission of power from the « motors to the wheels and for the ar- « rangement of trucks, have in almost « all cases given satisfaction.

« The Congress, however, recommends « to the Railway Companies the carrying « out of methodical trials, with a view « of determining whether, at high speeds, « electrical locomotives with motors sus- « pended by the nose have a more injuri- « ous effect on the track than other types.

« As regards locomotives without coup- « ling rods, and with motors completely « suspended from the frame, the Con- « gress recognises that, all other things « being equal, one can adopt a heavier « weight per axle than with locomotives « in which certain masses are recipro- « cating, not being completely balanced, « — as is the case in fact with the ma- « jority of steam piston locomotives.

« 3. From the electrical point of view, « the Congress appreciates that as a re- « sult of the improvements in recent « years, and having in view the arrange- « ments which have been made to pro- « tect the staff against accidents, loco- « motives of different types give general « satisfaction from the point of view of « their functioning, and give perfect pro- « tection to the staff.

« Traction motors in particular at pre- « sent give complete satisfaction as re- « gards heating, power and commutation.

« However, the Congress calls attention « of designers to certain details of con- « struction such as the insulation of va- « rious parts of the motors, etc., with a « view to reducing damage which occurs « from time to time.

« Consequently, the Congress trusts « that attention will still be given to these « points with the object of developing « new technical specifications, which

« at the present time are being consider-
« ed by several international associations.

« 4. The Congress also notes that from
« the point of running and regularity of
« service, recently constructed electric
« locomotives give satisfactory results.

« It requests the various Companies
« and Administrations to regularly and
« freely publish the results of operation
« on their electrified lines with a view
« to helping other administrations in the
« study of new applications of electric
« traction. »

— This summary was adopted by Section II without any objections being raised, and by the General Meeting held on the 15 May, except for a slight alteration to paragraph 2 (included in the above text).

QUESTION VIII.

All-steel coaches. Comparison with vehicles built of wood.

Preliminary documents.

1st report (Belgium, France and their Colonies), by Messrs. LANCRENON and VALLANCIEN. (See *Bulletin*, July 1929, p. 1023 or separate issue No. 10.)

2nd report (other countries, except America, the British Empire, China, Japan and Germany), by Messrs. M. GARCIA-VARO and P. FRAILE. (See *Bulletin*, September 1929, p. 1771 or separate issue No. 23.)

3rd repord (America, British Empire, China and Japan), by Mr. E. J. H. LEMON. (See *Bulletin*, June 1929, p. 589 or separate issue No. 5.)

4th report (Germany), by Mr. E. DÄHNICK. (See *Bulletin*, February 1930, p. 635 or separate issue No. 63).

Special Reporter : Mr. LANCRENON. (See *Bulletin*, May 1930, p. 1422).

Report of Section II.

(See *Daily Journal of the Session*, No. 9, p. 3 and No. 10, p. 2).

The PRESIDENT asked Mr. LANCRENON, the *Special Reporter* on this subject, to give a short résumé of his report. Mr. Lancrenon summarised the various chapters of his report into five parts :

Utility of metal construction;
Types of carriages;
Processes of construction; Materials;
Interior fittings;
Comparison with carriages with wooden bodies.

To each of these chapters correspond one or two summaries which appear on page 1426 of the special report. In view of the short time available for the discussion, Mr. LANCRENON proposed to the PRESIDENT that they should proceed at once to the discussion of these summaries. As an examination of these summaries would not raise many difficulties, because the summaries arrived at by the four Reporters were identical, it should be possible to raise an interesting exchange of ideas on the various resolutions contributed by each one of the Reporters to the different problems which arise in the construction of metal carriages.

At the same time, he thought that the discussion should follow the logical order, except that summary No. 2 should be taken after No. 6.

The PRESIDENT then turned to the discussion of paragraph No. 1.

Mr. GRESLEY (*London & North Eastern Railway*) thought that the text was too

absolute; metal construction in England had appeared particulary difficult, and steel construction lent itself less to the construction of vehicles with side doors for each compartment.

Mr. Dahnick (*Reporter*) said that it was not necessary in the latter case to increase the weight in order to maintain the same co-efficient of safety. In reply to a question by Mr. Koller (*Czechoslovakian State Railways*), he stated that in his opinion the metal carriage did not entail more cost than a wooden vehicle.

Mr. Lemon (*Reporter*) then intervened, and a discussion arose on the resistances, in the case of a collision, of metal coaches and wooden coaches. Messrs. Van Schouwenburg (*Dutch Indies Railway Company*), Dähnick, Renevey (*Paris-Lyons-Mediterranean, Algerian Lines*), Wechmann and Wagner (*Deutsche Reichsbahn Gesellschaft*) all gave information with regard to accidents which had occurred on their railways.

Mr. Lancrenon, in agreement with Messrs. Bianchi (*Italian State Railways*), Gresley and Lemon, proposed that paragraph No. 1 should be deleted; a new text, which was finally adopted, should be substituted.

Paragraph 3. — After an exchange of views, Mr. Dähnick and Mr. Lancrenon agreed to make a slight alteration in the original text, *i. e.*, « Very little heavier than » should read « Very little different from ».

This modification was adopted.

Paragraph 4. — Mr. Vallancien (*Reporter*) asked that mention should be made of the metals and light alloys amongst the materials used for the construction of metal coaches.

Mr. Fraile (*Reporter*) stated that the North of Spain Railways were using aluminium and had met with difficulties with corrosion. He asked whether other railways had encountered the same difficulty.

Mr. Leroy (*French Nord Railway*) stated that the French Railways had used duralumin and had not met with any difficulties with corrosion.

Mr. Bloch (*Paris-Orleans Railway*) mentioned cases of corrosion with duralumin in contact with compound floors and Mr. Legrand (*French Est Railway*) cited cases when it was in contact with wood.

Mr. Dähnick stated that the Metropolitan system of Berlin was going to make a trial with carriages in which aluminium would figure largely.

After an exchange of views between Messrs. Lancrenon, the President and Mr. Bloch they agreed to modify the paragraph in question and this modification was adopted.

Paragraph 5. — After an exchange of views by Messrs. Leroy and Fraile in regard to the use of welding and the consequences which followed when vehicles were undergoing repairs, the text proposed was adopted.

Paragraphs 6 and 2. — The interior decorations of carriages did not give rise to any particular discussion. However, the second part of this paragraph caused Mr. Fraile to remark that in the countries where the summer temperature is particularly high it was not possible to give the same comfort to travellers in metal carriages, subject in which Messrs. Dähnick, Vasconcellos (*Portuguese Railway Company*), Van Schou-

WENBURG and BLOCH took part. Mr. BLOCH stated that the Paris-Orleans Railway had carried out an experiment with an arrangement for cooling air and circulating it through the carriages.

At length on the proposal of the PRESIDENT a modification of the original text was adopted, keeping in view the observations which had been made on this subject.

Paragraph 6 (No. 7 of the special report). — Mr. KOLLER asked what was the experience of Companies concerning maintenance costs, and « general overhaul » costs of metal carriages.

Mr. LANCRENON replied that the Railway Companies had only 5 to 10 years experience, and they were not therefore able to give precise information.

The costs of maintenance would appear to be the same in both cases, but concerning overhauls it was necessary to draw attention to the fact that the damage done in case of accidents was probably less for the steel coaches than for the wooden coaches, and further, wooden carriages after 10 to 15 years service required an extensive overhaul, in contrast to the ancipitation of the greater length of time between general overhauls to metal carriages.

Mr. DÄHNICK confirmed this, and drew attention to the fact that many of the small repairs necessary on wooden carriages would be avoided when metal carriages were used.

Mr. ANDRÉ (*Madrid-Saragossa-Alicante Railways*) proposed to complete this paragraph by the words : « results however so far obtained have been encouraging ». — Adopted.

Paragraph 7 (No. 8 in the special report).

Mr. VALLANCIEN stated that the only great danger in case of accident on metal carriages was the breakage of glass. He asked that this should be specially mentioned in the summary. — Adopted.

The summary finally adopted was as follows :

SUMMARY.

« 1. In those countries in which the operating conditions permit the construction of all-steel carriages, experience has shown that conditions of safety sufficiently justify the adoption of this construction for new work.

« 2. To prevent excessive weight, it is desirable that the body should take part of the stresses.

« Coaches built on this principle have a tare weight very little different from that of coaches with wooden bodies offering the same standard of comfort.

« 3. In this form of construction it is possible to combine rolled sections, bent and pressed flat plates, cast steel and malleable iron castings.

« In every way metal construction lends itself to the mass production of standardised parts.

« In order to lessen the weight of metal carriages, several administrations have carried out trials with high resistance steels and light alloys. The Congress recommends that the study of the use of these metals should be continued.

« 4. Assembly can be done by means of rivetting, oxyacetylene welding, arc or spot welding or by a combination of these methods.

« 5. The interiors can be fitted out in the same way as wooden vehicles. They

« can however be given a distinctive ap-
« pearance if the metal plates are left
« visible and the interior decorations
« treated accordingly. In most cases me-
« tal coaches can be fitted up so as to
« assure to the public a degree of com-
« fort equal at least to that of the ve-
« hicles with wooden bodies.

« 6. The methods of construction are
« still too varied and the vehicles on nu-
« merous railways have been put into
« service too recently to allow precise
« conclusions to be formed regarding the
« first cost of construction and the re-
« pair charges. Results so far obtained
« however have been encouraging.

« 7. Numerous experiments have still
« to be made both as to the choice of the
« methods of construction and the mate-
« rials to be used in fitting out the inte-
« rior, such as heat insulation of the
« body sides, the floor covering, interior
« linings, breakage of glass, painting, and
« protection of plates against rust. »

— Except for a slight modification (in-
cluded in the above text), the General
Meeting held on the 15 May adopted this
summary.

SECTION III.

Working.

President : Mr. Le Besnerais.

Vice-Presidents : A. L. Gibson, P. P. de Alarcon and H. Jezierski.

Principal Secretary : J. P. Van Ryn.

QUESTION IX.

Relations between railways and sea ports.

Lay-out of maritime stations; arrangement of outer and inner basins so that the most efficient lay-out of sidings may be provided for working them; operating and rate fixing methods; loading and discharging appliances.

Preliminary documents.

1st report (all countries, except those hereafter), by Messrs. E. Ehrenfreund and L. Belmonte. (See *Bulletin*, July 1929, p. 1093 or separate issue No. 11.)

2nd report (America, the British Empire, China and Japan), by Mr. C. M. Jenkin Jones. (See *Bulletin*, October 1929, p. 2257 or separate issue No. 31.)

3rd report (Belgium, France and their Colonies), by Mr. U. Lamalle. (See *Bulletin*, February 1930, p. 535 or separate issue No. 61.)

Special Reporter : Mr. C. M. Jenkin Jones. (See *Bulletin*, May 1930, p. 1425.)

Report of Sections I and III combined.

(See *Daily Journal of the session*, No. 2, p. 5 and No. 6, p. 2.)

The Special Reporter, Mr. Jenkin Jones, being away ill, the President asks Mr. Gibson, Vice-president, to read the conclusions in his place. He also transmits the best wishes of the meeting for the prompt recovery of Mr. Jenkin Jones.

Mr. Gibson then submits the proposed conclusions to the approbation of the Congress.

Mr. Belmonte *(Reporter)* points out that in many cases, the conditions of construction of the lines and stations serving the ports are imposed by the particular disposition of the latter.

The President and Mr. Lamalle *(Reporter)* believe that it behoves the Congress to determine the best conditions under which new ports should be established or extensions made to existing ports.

Article 1 gives rise to a thorough discussion between Messrs. Lamalle, Simon-Thomas *(Netherlands Railways)*, Gaere-

MYNCK *(Belgian National Railway Company)* and LEIBBRAND *(Deutsche Reichsbahn Gesellschaft)*, as to the conditions under which it would be preferable to seek a derogation to the generally accepted principle of a *single* station, or concentration yard in favour of several. The conclusions of the special report are finally adopted with a few slight modifications.

The text of Article 2 of the general conclusions is approved after discussion and a show of hands.

Article 3 is approved without discussion.

Article 4 is accepted after a slight modification proposed by Mr. SIMON-THOMAS, seconded by Messrs. GIBSON and LAMALLE.

Articles 5, 6, 7 and 8 are accepted without discussion.

Article 9 gives rise to discussion; there are two theses propounded : According to the first, no directive should be given as to the minimum curve to be accepted. this question not concerning exclusively the lay-out of railways in ports. According to the other thesis, it is, on the contrary, important that indications should be given in order that the authorities undertaking the construction of a new port may derive guidance therefrom. The second point of view is accepted. The following took part in the discussion :

Messrs. MÜLLER *(Deutsche Reichsbahn Gesellschaft)*, LEMAIRE *(Belgian National Railway Company)*, LAMALLE, FRASER *(London & North Eastern Railway)*, DIREZ *(French State Railways)*, FIORI *(Italian State Railways)*, FOWLE *(Great Indian Peninsula Railway)*, FOX *(Central Argentine Railway)* and PALMIERI *(Italian State Railways)*.

Article 9 is adopted with a few modifications.

Article 10. — On the proposal of Mr. BELMONTE, this is replaced by article 10 of Mr. Lamalle's report.

Articles 11, 12, 13, 14, 15 and 16 of the special report are adopted, some of them being slightly modified.

Mr. LAMALLE proposes to add, in the form of an additional article coming after article 14, article 16 of his own report. This motion is seconded by Mr. Belmonte and Mr. Gibson and is approved.

SUMMARY.

The railways of a big port.

« 1. In principle, one harbour concen- « tration yard is preferable. Neverthe- « less, several may be justified, as fol- « lows :

« *a*) Under certain geographical con- « ditions;

« *b*) If the volume of traffic exceeds « the capacity of a single concentration « yard;

« *c*) When certain specific traffics are « ensured by special trains entirely in- « dependent of the general services.

« 2. The stations should have separate « groups of sidings and running lines « for inwards and outwards traffics.

« 3. The yard should be sufficiently « large to take up the repercussions due « to temporary cessation of traffic mo- « vements in either direction.

« 4. The concentration yard may be « used for shipping, local and through « railway traffics, so long as the limit of « capacity of a single yard is not exceed- « ed and the organisation of the mari- « time service does not suffer.

« 5. — The shunting may, with advantage, be concentrated in the harbour station, and the shunting at the quays limited to sorting to hatches and destination order when loading direct into ships, or to shed or warehouse bench order.

« 6. Ample holding tracks should be provided at the quays to ensure continuity of service at the ships or sheds.

« 7. Wagons discharged at the quays should not be passed empty to the concentration yard if they can be reloaded at quays to which they have ready access.

« 8. Consignments for export should not be split up en route unless the traffic is passing in such volume that continuity of loading can be maintained.

« 9. The lay-out of harbours, and particularly the orientation of jetties and moles, should permit of the adoption of easy railway curves : for normal gauge, a curve of 120 metres (6 chains) radius is considered to be the minimum. It is desirable to increase this to 150 metres (7 1/2 chains) for tracks used by the larger locomotives of normal type.

« The figures relative to wide and narrow gauges should be arranged according to the respective necessities.

« 10. It is important not only that the quays be constructed of sufficient width in relation to the size of the dock, but also that sufficient space should be reserved on the quays for the railway to lay down methodically its lines in order to allow such speed of movement to trucks as will meet the requirements of commerce.

« 11. There should be at least three tracks alongside the quays with crossings at intervals in order to give the best working facilities.

« 12. Switches should be used generally and are preferable to turntables or traversers for shunting purposes.

« 13. At quays where road vehicles are largely used, quay tracks with grooved rails sunk to the ground level are convenient, and this arrangement permits tow-motors to be used in place of ordinary locomotives for shunting duties.

« 14. The capacity of quay cranes should not exceed the weight of the bulk of the articles to be lifted. Dual capacity cranes are economical and provide for occasional lifts that are heavier than normal.

« Cranes should be arranged to give free movement of wagons along the quays and to have sufficient reach to plumb the wagons on the quay lines and the further side of the ships hatches.

« Cranes of the luffing type have many advantages.

« High capacity floating cranes are considered to be the most satisfactory means of handling heavy lifts.

« For loading and unloading wagons and sorting and storing traffic in sheds and warehouses, travelling bridge cranes fitted with revolving jibs which can be projected through the shed sides over outside wagon tracks are efficient.

« The number of quay cranes per berth is considered to be as important a consideration as the determination of their capacity. The number should not be less than the normal number of hatches in vessels regularly using the port.

« 15. In order to hold to a port any specific heavy traffic, it is indispen-

« sable that special accommodation be « reserved for it, adequately provided « with appropriate handling contrivances.

16. In order to reduce the time wa- « gons are detained, the prescriptions re- « gulating the penalties for delay ought « to be as stringent as permitted by oper- « ating and labour conditions, so as to « constitute a safeguard against blocking « up the harbour and against immobi- « lisation of the railway rolling stock.

« 17. The organisation of the staff of « the harbour, the railway and the cus- « toms is of the highest importance and « ought to be such as to enable all ser- « vices to function smoothly and rapidly.

« Finally, too much stress cannot be « laid on the necessity for a close colla- « boration between the Railway Compa- « nies and the Port Administration when « it is a question of altering or extending « existing harbours or planning new « ports. »

QUESTION X.

Methods to be used in marshalling yards to control the speed of vehicles being shunted, and to ensure they travel on to the lines in the various groups of sidings.

Preliminary documents.

1st report (all countries, except those hereafter), by Mr. C. Fiala. (See *Bulletin*, August 1929, p. 1277 or separate issue No. 14.)

2nd report (America, the British Empire, China and Japan), by Mr. C. R. Byrom. (See *Bulletin*, June 1929, p. 715 or separate issue No. 6.)

3rd report (France, Italy, Portugal, Spain and their Colonies), by Messrs. Pellarin and Farenc. (See *Bulletin*, December 1929, p. 3059 or separate issue No. 47.)

4th report (Germany), by Dr. Ing. P. Gottschalk. (See *Bulletin*, January 1930, p. 309 or separate issue No. 57.)

Special Reporter : Mr. C. R. Byrom. (See *Bulletin*, May 1930, p. 1437.)

Report of Section III.

(See *Daily Journal of the session*, No. 4, p. 4 and No. 6, p. 10.)

After the reading by Mr. Byrom of the conclusions of his special report, the President opens the general discussion.

Mr. Fiala, *Reporter*, points out that certain railway companies use exclusively hand brakes; on these systems all vehicles should be equipped with these brakes, which considerably increase the deadweight of vehicles and trains; article 2 of the conclusions could be usefully completed by this remark.

Dr. Gottschalk, *Reporter*, draws attention to a point which appears to him to be very important, *viz.*, the rapidity of shunting depends on a whole series of factors, the braking of wagons coming down the hump being only one of these.

The President is in entire agreement with this point, but he judges that the full subject was gone into at the London Congress; question X is only carried on the programme of the 11th Session to deal with the question of braking to complete the subject of marshalling yards of the 10th session.

Mr. Simon-Thomas (*Netherlands Railways*) re-traces the history of the question of wagon braking in shunting yards; he draws attention to the results obtained with the Thyssenhütte brake, which appears to him to answer best the requi-

rements of the case. He would like to know why brake shoes mechanically controlled have obtained so much success in France.

THE PRESIDENT thanks Mr. Simon-Thomas for the exposition of his is point of view; he points out that the reasons why French railway companies continue to utilise brake shoes are given in the report of Messrs. Pellarin and Farenc, who further, have not wished to recommend specially any brake made by any particular firm.

Mr.. FARENC, *Reporter*, states that in France the first rail brake was installed in 1911. So far, rail brakes have given less interesting results than slippers, but there is nothing to prove that, after further trials, they will not go back to rail brakes.

Messrs. BYROM, LEIBBRAND (*Deutsche Reichsbahn Gesellschaft*), LAMALLE (*Belgian National Railway Company*) and PELLARIN, agree that it would be premature to recommend exclusively any particular type of braking appliance.

The general discussion is then closed, and the proposed conclusions are examined in detail.

Article 1. — Dr. GOTTSCHALK believes that it would be desirable to make mention of the electro-magnetic brake.

THE PRESIDENT agrees and considers that the general observations made by Dr. Gottschalk should be mentioned. Article 1 is altered in accordance therewith.

Mr. GAEREMYNCK (*Belgian National Railway Company*) draws the attention of the meeting to the subject of the mechanical means to be adopted for accelerating wagons.

Article 2 is adopted.

Article 3. — Mr. FIALA proposes to stress the fact that the use of brake slippers or rail brakes enables, in certain cases, a reduction to be made in the number of brakes in a train, and, as a consequence, to decrease the dead weight of the said train.

Mr. LAMALLE suggests that this point should not be insisted upon, as the hand brake appears destined to disappear on the majority of systems.

Mr. FIALA agrees to this proposition.

Article 4. — Mr. RENARD (*French Est*) points out that when a shunter accompanies each wagon, there would not appear to be any sharing of responsibility.

Mr. BYROM replies that in England the same wagon is braked successively by different individuals.

THE PRESIDENT proposes to point out that only English practice is concerned.

Articles 5, 6, 7, 8 and 9 are adopted, the last one with slight modifications.

Article 10. — Mr. SIMON-THOMAS proposes that this article, which is a repetition of one of the conclusions of the London Congress, should be deleted.

After an exchange of views in which the following take part : Messrs. the PRESIDENT, PELLARIN, DIREZ (*French State Railways*), LAMALLE and FARENC, it is decided to maintain this article but slightly amended in accordance with the proposals of Messrs. GAEREMYNCK and GOTTSCHALK.

Article 11. — This article gives rise to a detailed discussion in which the following join : Messrs. FARENC, LAMALLE, PELLARIN, BYROM and MICLESCO (*Rumanian State Railways*). A new wording is adopted.

Articles 12 and *13* are deleted.

Article 12 (formerly 14). — Dr. Gottschalk considers that the opinions set out apply equally to rail brakes and to brake slippers. The article is modified in consequence.

Mr. Sherrington (*London & North Eastern Railway*) points out that, at their Whitemoor Yard, four rail brakes in use in their leads to various sidings have given entire satisfaction.

Articles 13 to *23* (formerly 15 to 25) are adopted with only slight modifications.

Article 24 (formerly 26) is deleted. This question, although very interesting, is not directly connected with braking. This article is replaced by a text concerning a trial of acceleration undertaken in Germany.

Article 25 (formerly 27) is adopted.

Article 26 (formerly 28). — Dr. Gottschalk considers that mention should also be made of the existence of other methods. This amendment is adopted.

Articles 27, 28, 29, 30 and *31* (formerly 29 to 33) are adopted after slight modifications.

The meeting finally adopts the summary the detail of which will be found below, but before concluding the meeting, the President summarises in the following terms the more salient features of the discussion :

In big marshalling yards it is important, for economical reasons, that shunting proceeds with the highest possible speed and it is necessary to have different methods of retarding the wagons, as the gradient of the hump should be such as to ensure that even the worst running wagon under the worst possible weather conditions, reaches the end of its proper siding.

It is therefore necessary to slow up the wagons, especially the better running ones, in fine weather, to ensure the correct spacing and to avoid shocks.

Hand-braking and manual braking by individual brake shoes are expensive and not exempt from danger.

Mechanical braking controlled from a distance is preferable.

Present methods can be classed in two categories :

Rail brakes;

Shoe brakes.

Present experience does not yet allow of a definite choice being made between these methods or of the different types, certain of which, in spite of the ingenuity shown, call for improvement.

The methods of acceleration also call for special study. The systems of lighting, signalling and transmission should also be perfected, in conjunction with the methods of shunting and retarding.

The control from a distance of switches is to be recommended and it is even preferable, in certain cases, that their working should be automatic.

The running of wagons is facilitated by the use of mechanical tractors (either on rail or road), which, when occasions arise, ensure contact between the shunted wagons.

SUMMARY.

« 1. The methods employed in marshalling yards to control the speed of vehicles being shunted consist of :

« A. A rational disposition of the lines and of their profile in order to ensure the most rapid shunting possible.

« B. To obtain the necessary slowing « down :

« *a*) Braking appliances fixed to the « vehicle (hand-brakes) ;

« *b*) Portable shoes or slippers placed « on the running rail or track by hand;

« *c*) Shoes, slippers, or skates placed « on the running rail or track by me- « chanical (including electrical) means « such placing being controlled from a « distance;

« *d*) Rail brakes or retarders parallel « to the running rail or track, exercising « either a lateral braking effect on the « sides of the wheels of vehicles, or a « braking effort induced by eddy cur- « rents, this braking being controlled « from a distance.

« 2. Hand brakes (*a*) and portable « shoes (*b*) necessitate the personal « attendance or accompaniment of per- « sonnel for the purpose of applying « braking when necessary and to the de- « sired extent.

« 3. Distance-operated shoes or ska- « tes (*c*) and rail brakes (*d*) permit of « completely or partially centralised « control of braking requirements, and « enable some reduction in braking per- « sonnel to be effected.

« 4. In hand and portable shoe brak- « ing, as practised in England, the res- « ponsibility may be divided between a « number of individuals.

« 5. In distance shoe or rail braking « the responsibility is concentrated in « one or a very few individuals who re- « quire to be located in an elevated posi- « tion commanding a bird's-eye view of « the sphere of operations.

« 6. At all large yards, where hump « or gradient shunting is in operation « or when new yards are contemplated, « consideration should be given to the « question of installing distance-con- « trolled shoe or rail braking methods.

« 7. The difference in conditions, ca- « pacity and weight of vehicles in gene- « ral, in the different countries, com- « bined with the fact that distance-con- « trolled shoe or rail brakes are in the « process of development and improve- « ment, and the lack of experience of « them in certain countries, prevent any « general conclusion being reached in « favour of a particular type.

« 8. The initial cost of introduction or « conversion to complete distance-con- « trolled shoe or rail braking is high « in comparison with methods employed « hitherto, but savings varying in extent « in different countries, by the reduction « of personnel, can be effected, of a per- « manent and continued character.

« 9. The economies can be supple- « mented by grouping together the con- « trol of point or switch operation in « the same location as the shoe or rail « brake control. It may be desirable « that the points should be « quick- « acting » and it is advantageous, at « high capacity hump yards, for the « points to be capable of being pre-set « electrically and automatically changed « by the vehicles themselves.

« 10. The primary considerations in « regard to the gradient and height of « the hump for distant-controlled shoe « or rail braking are that it shall be such « that the worst running vehicle under « the most adverse conditions, curvature « of track, weather, etc., shall reach the « full distance required. Also that the « preliminary character of the gradient « shall be such as to give a sufficient « impetus to vehicles or cuts at the start,

« so that they are sufficiently separated « prior to reaching the points or switches and shall not stop in the point or « switching area.

« 11. The necessary brake pressure to « absorb, if required, the surplus speed « can be concentrated or spread out « through several appliances according « to the power of the type employed:

« The space available could be taken « as the predominating factor as to the « type of apparatus to adopt. It may be « necessary, even with a very powerful « type of apparatus, to possess several « series of brakes in order to regulate « the speed during the run from the « hump and to maintain the space between wagons of a different co-efficient « of running.

« 12. In principle, in mechanical brake « installations, the first set is usually « placed at the foot of, or immediately « below the first or steepest part of the « gradient with as many more sets as « may be necessary, on the leads into the « groups of sorting sidings, and with a « further set at the commencement of « each of the individual sidings clear of « point or switching area.

« 13. In purely rail braking installa- « tions the brake rails, one set or more « as necessary, are usually located in « the leads to the various groups of « sidings only.

« 14. The greater the extent to which « braking power, with the necessary « elasticity of application, can be concentrated in the fewest appliances, the « less staff of operators is required, so « that the work can be speeded up, as « an operator, instead of having to watch « a vehicle or cut through a succession « of brakes, can the sooner turn his attention to the next oncoming vehicle « or cut.

« 15. Certain forms of rail brake make « it possible to obtain a braking force « proportional to the weight of the vehicle or cut, which is an advantage, « provided the construction is such that « light vehicles are not lifted out when « pressure is applied.

« 16. The initial cost of such rail « braking appliances is at present comparatively high and necessitates certain standard features of design of « layout of track, *i. e.* the balloon-shaped « formation, with points or switches at « more or less equal radii from the « hump.

« 17. The initial cost of shoe braking « apparatus is stated to be appreciably « less and in suitable instances may be « applied to existing layouts.

« 18. Certain types of rail brake are « of such length that brake pressure can « be increased or decreased at will as « vehicles or cuts of vehicles are passing through them.

« 19. With the shoe brake there is not « the same facility, as once the wheel « has mounted the shoe the pressure is « constant until the shoe leaves the track « at what is a fixed position or cut-out.

« 20. One form of shoe brake has its « normal rest position at the lower end of « the brake area and is propelled towards « an oncoming vehicle to the pre-judged « distance necessary, by the operator at « will.

« 21. Another form of shoe brake has « its normal position at the higher or « commencing end of the braking area « and may be placed on the rail at will « by the operator as necessary and pro-

« vides for the return of the shoe to the « starting point automatically.

« 22. Rail brakes may be operated or « controlled electrically, hydraulically, « or pneumatically, or in part combina- « tion.

« 23. A purely automatic shoe braking « appliance governed by the speed and « weight of vehicles approaching and by « the extent of occupation of the siding « to be entered is in the experimental « stage but this as yet appears to neces- « sitate limiting to two at a time the « number of vehicles being shunted.

« 24. Another appliance of interest « which is at present being tried out is « an accelerator which gives an additio- « nal impulse to badly running wagons « or during unfavourable atmospheric « conditions.

« 25. A sufficient lighting arrange- « ment of a modern type is desirable for « all large marshalling yards, and parti- « cularly where rail-braking or shoe « braking methods are in force.

« 26. Luminous signalling devices pro- « viding suitable code is advantageous « for controlling speed of hump opera- « tions, being duplicated as necessary and « supplemented by oral code signal such « as electric or klaxon horns if required. « It is found desirable to develop in- « creasingly the systems which allow of « the chief foreman directing operations « to himself order the movements of wa- « gons from the train about to be shunt- « ed.

« 27. Mechanical means for the trans- « mission of cut lists or other documents « afford a desirable means of expediting « the conveyance of train papers, cut « lists, etc., between the essential posts « in the yard.

« 28. Electric teletype machines afford « a ready and expeditious means of trans- « mitting at one operation the switch- « ing or cut lists and of giving instruc- « tions to the rail brake and point or « switch operator's cabin and other parts « of the yard as necessary.

« 29. Loud speaker telephones for ver- « bal messages are of considerable bene- « fit for rapid communication between « certain key positions in a hump yard.

« 30. In general the advantages claim- « ed for distance-controlled braking me- « thods embrace some, if not all, of the « following advantages, according to lo- « cal circumstances and the particular « type of apparatus used :

« *a*) Reduction in number and cost « of brakesmen;

« *b*) Damage to goods and rolling « stock diminished, with consequent re- « duction in claims and maintenance « costs;

« *c*) Increased safety of employees;

« *d*) Slow working due to adverse « weather conditions is counteracted;

« *e*) Operating capacity of yards is « enlarged;

« *f*) Closing of small yards by concen- « trating the work at one large yard;

« *g*) Certain yards closed during part « of the 24 hours;

« *h*) Avoidance of employment of « extra staff in bad weather, or when « extra shunting has to be done.

« *i*) Reduction in locomotive-hours.

« 31. In certain instances where space « permits, economical use has been made « of small tractors capable of running « between the different sidings and cross- « ing the rails when necessary, for the « purpose of propelling or hauling one « or more vehicles at a time and closing

« up the vehicles which have been « shunted. »

— These conclusions were ratified by the General Meeting held on the 10 May.

QUESTION XI.

Signalling of lines for fast traffic and in main stations. Daylight signals. Automatic block system.

Preliminary documents.

1st report (America, the British Empire, China and Japan), by Mr. G. H. Dryden. (See *Bulletin*, September 1929, p. 1805 or separate issue No. 24.)

2nd report (other countries, except Belgium, France, Italy, Portugal, Spain and their colonies), by Mr. J. Kristensen. (See *Bulletin*, December 1929, p. 3155 or separate issue No. 50.)

3rd report (Belgium, France and their Colonies), by Mr. G. C. A. Willaert. (See *Bulletin*, February 1930, p. 723 or separate issue No. 65.)

4th report (Italy, Portugal, Spain and their Colonies, by Messrs. A. Gibert and J. Noguès. (See *Bulletin*, April 1930, p. 1161 or separate issue No. 72.)

5th report (Germany), by Mr. W. Stäckel. (See *Bulletin*, March 1930, p. 997 or separate issue No. 69.)

Special Reporter: Mr. W. Stäckel. (See *Bulletin*, May 1930, p. 1448).

Report of Sections II and III combined.

(See *Daily Journal of the session*, No. 5, p. 4 and No. 6, p. 2.)

The President calls on Mr. Stäckel, *Special Reporter*, who reads a resumé of his report and gives the conclusions that he proposes. Mr. Stäckel states the principal points at which he has arrived in connection with signalling of main lines, the grouping of home and distant signals and the distance to be adopted for the situation of the advance signal, the signalling of switches, the necessity of distant signals, the advantages which can sometimes be obtained by disc signalling, and lastly the conditions in which there appears to be an economy to be derived from the use of the automatic block system. He points out that Question XI being a part of question IX of the London Session, he would suggest that the meeting should try and complete the resolutions adopted in 1925.

Mr. Kristensen, *Reporter*, considers that there is no need to discuss the question as to whether signals of 2, 3 or 4 positions should be used. He avers that each one of these signals answers a special problem and requires special conditions for its use.

Mr. Tuja *(Paris-Lyons-Mediterranean)* explains the principles along which the big French railways are now proposing to modify their signalling arrangements (principles which appear to be very similar to the conclusions of Mr. Stäckel *viz.*: adoption of green for « line clear », pre-eminence at facing points of the speed indication; grouping of signals and effacing of the less imperative indications). He adds that the big French railways are in favour of the automatic block system and the simplification of diagramatic representation, and that they consider, for lines of secondary importance, the use of a different method of signalling from that of main lines. At the request of Mr. Stäckel, he adds that French Railways will maintain two stop signals : one absolute, the other permissive.

The President and Mr. Stäckel thank Mr. Tuja for his interesting account of French railway signalling arrangements.

After a discussion in which take part Messrs. Lemonnier *(French State Railways)*, Wais *(North of Spain Railways)*, Willaert *(Reporter)*, Palmieri *(Italian State Railways)*, Pellarin and Renard *(French Est Railway)*, Kristensen, Noguès *(Reporter)*, Lamalle *(Belgian National Railway Company)* and Collin *(French Government)*, the summary presented by Mr. Stäckel was adopted after a few slight modifications and after being completed with regard to the following points :

The interest of grouping signals.

The placing on record of the interest in signalling for slowing down.

The interest aroused in disc signals in certain cases.

Evidence of the general use of colour light signals.

The tendency to simplification of the automatic block system.

In connection with an enquiry made concerning the particular cases for use of each type of signal, the President explained that each case must be dealt with by itself.

The text finally adopted is as follows :

SUMMARY.

I. — (Which completes resolution I of the London Session).

« As the *basis* for signalling express « train routes, a stop signal with two po- « sitions and an advance signal also with « two positions are necessary.

« The determination of the minimum « distance between advance and home « signals should be based upon the most « unfavourable conditions of braking and « visibility.

« An extension of this signalling by additional signal positions may be necessary, for the following purposes :

« A. *Home signal.*

« 1. To specify a speed limit through « points adjacent to home signals (when « branching off), or

« 2. To indicate the route (at turn- « outs).

« 3. To permit the permissive passing « of « home » signals after a preliminary « stop. »

« 4. To permit heavy goods trains to « run slowly past the « stop » signal on « gradients.

« 5. To specify speed limits through « the section or on approaching the next « home signal.

« B. *Advance signal.*

« 1. To indicate a limitation of speed « (A1 or A5).

« 2. To indicate the route at the junc- « tion (A2).

« It is indispensable to reduce to a mi- « nimum the number of indications gi- « ven by the signals, particularly in places « where a number of signals are grouped « and the suppression of the less impera- « tive signals is to be recommended.

« In this connection mechanical signals « giving three or four positions, and lu- « minous (daylight) signals, offer great « advantages, particularly when the dis- « tance between stop signals is small. « The safe working of the service how- « ever places a limit on the eliminaiton « of signals.

II. — (Completes Resolution II of the London Session).

« In certain cases, the use of a disc sig- « nal, placed on a level with the eye of « the driver can also be considered.

III. — Completes Resolution III of the London Session).

« Any further signal positions that are « necessary can be obtained by grouping « these lights in pairs or banks, which « may be vertical, horizontal or diagonal, « or by the addition of a marker light, « or a flashlight arrangement. Care must « be taken that the extinction of one « light does not result in an indication « less favourable to security.

IV. — (Concerns Resolution VI of the London Session).

« The use of luminous signals, and par- « ticularly of coloured light signals, is « becoming more and more general even « on non-electric systems.

« *Daylight signals* have the advantage « over position signals (semaphore-disc) « that their visibility is not affected by « an unfavourable background, by mists « or by twilight; they avoid moving parts « which may be affected by frost. Day- « light (luminous) signals are particu- « larly suitable for giving more than « three signal indications on one signal, « by the supplementary use of various « groupings of pairs of coloured lights. « A comprehensive signal of this kind « which shews to the observer at any « time only one definite signal aspect « is preferable to the combination of se- « veral two or three-aspect conformation « signals.

« Special care must be taken to see that « a good horizontal dispersion of the lu- « minous rays at curves is given, to the « good visibility of the signal to a train « arrived at its foot as also the guaran- « tees of security as regards the source « of supply of electric current.

V. — (Completes Resolution VII of the London Session).

« Automatic block-working with suit- « able lay-out and methods of installation « gives a better safeguard against incor- « rect signalling than manual block- « working. The automatic block system « allows of an economy which is increas- « ed commensurately as the distance is « increased between the cabins which it « is necessary to have manned. It would « further appear that in the present state « of technical progress, the automatic « block system should be limited to lines « constructed with wooden sleepers and, « when these carry dense traffic, it « should be installed only where there « is no objection to the permissive pas- « sage of a train into an occupied block « section. The tendency is towards sim- « plification in working methods which, « without diminishing safety, shall re- « duce to a minimum delays due to fai- « lures or irregularity.

« VI. — The use of power operation « has rendered possible the control of ex- « tensive station installations from a « *single* control frame. Such centralisa- « tion is particularly expedient when the « outlying points are not used for shunt- « ing.

« The control of the whole of the sa- « fety appliances of a long stretch of « line from a single dispatcher point has « proved to be practicable, low-voltage « batteries being installed locally for op- « erating the points by means of slow- « running motors. It is desirable to « continue investigations on this subject.

« VII. — The methods adopted for en- « suring the *safety of shunting move- « ments at large stations* are on some « railways similar to those used to safe- « guard the running of trains; on an- « other group of railways, however, « these safeguards are dispensed with « and they are satisfied to protect the « traffic against shunting by safety

« switches, train locks or mechanical « blocks or derailers.

« It is desirable that further considera- « tion should be given to this question. « also to the advisability of making use « of main signals for ensuring the sa- « fety of shunting traffic. »

— These conclusions were adopted by the General Meeting held on the 10 May.

QUESTION XII.

Economical traction methods for use in particular cases, as for example :

A) Organisation of train services on the minor lines of the large systems, carrying little traffic, and of little used trains on the more important lines of these systems.

B) Use of special tractors for shunting in smaller yards and for certain work in large yards.

Preliminary documents.

1st report (the British Empire, China and Japan), by Mr. R. H. Nicholls. (See *Bulletin*, September 1929, p. 1869 or separate issue No. 25.)

2nd report (other countries, except those hereafter), by Mr. H. Hunziker. (See *Bulletin*, December 1929, p. 2859 or separate issue No. 42.)

3rd report (Belgium, France, Italy, Portugal, Spain and their Colonies), by Mr. O. A. Gaeremynck. (See *Bulletin*, January 1930, p. 147 or separate issue No. 53.)

4th report (Germany), by Mr. Leibbrand. (See *Bulletin*, February 1930, p. 585 or separate issue No. 62.)

5th report (America), by Messrs. H. B. Voorhees and Geo. H. Emerson. (See *Bulletin*, March 1930, p. 771 or separate issue No. 66.)

Special Reporter : Mr. Gaeremynck. (See *Bulletin*, May 1930, p. 1460.)

Report of Sections III and V combined.

(See *Daily Journal of the session*, No. 7, pp. 3 and 4, and No. 9, p. 4.)

Sections III and V met to consider jointly *Part A of Question XII and Question XX.*

The meeting was opened under the chairmanship of Mr. Jacobs, *Vice-President* of Section V, who later relinquished the Chair to Mr. Crispo, *President* of that Section.

Mr. Beghin *(Chemins de fer Départementaux, France)* read his report on Question XX and added an observation relative to accumulator motor vehicles and those driven by internal combustion engines using producer gas.

He proposed the addition to the summary of two supplementary clauses which are not contained in his report.

Mr. Gaeremynck, *Special Reporter*, read the summary to the first part of his report.

Mr. Lo Balbo *(Piedmont Steam Tramways)* emphasized the advantage that may be derived from traction by accumulator motor vehicles.

Mr. Reder, *Secretary*, drew attention to the points which should receive particular attention when it is desired to use rail motor vehicles.

Prior to a vote being taken upon the summaries, Mr. Beghin remarked that there is no contradiction between his summary and that of Mr. Gaeremynck. The divergencies which may exist result

from the fact that the applications to be contemplated are somewhat different.

A discussion ensued upon the wording to be finally adopted. Messrs. LAMALLE *(Belgian National Railway Company)*, LO BALBO, CZAPSKI *(Polish Government)*, MICLESCO *(Rumanian State)*, LEIBBRAND *(Deutsche Reischbahn Gesellschaft)*, JACOBS and MOUTIER *(French Nord)* took part in this discussion.

The summary adopted by the meeting relative to Part A of Question XII is as indicated below.

After an exchange of views which took place at the General Meeting on the 14 May, paragraph 2 was slightly altered, the words « or with accumulators » being added after the brackets (explosion or Diesel).

The examination of Part B of Question XII took place under the presidency of Mr. LE BESNERAIS. The PRESIDENT asked the special reporter, Mr. GAEREMYNCK, to summarise his report and to formulate a summary.

The general discussion did not bring out any comments.

The PRESIDENT particularly thanked the German reporter, Mr. LEIBBRAND, who had given a very complete report on the various means which were used in Germany to reduce the working costs on the secondary lines.

Mr. TUJA *(Paris-Lyons-Mediterranean)* would like to see special mention made of the two possible uses to which « locotractors » could be put.

Mr. LE POITTEVIN *(French Nord)* had some doubts as to the economies which could be effected from the use of tractors equipped with internal combustion engines.

Mr. FRANK *(Polish Government)* asked that the paragraph with regard to rubber tyres in the third summary should be cut out.

Mr. LEIBBRAND drew attention to tractors working on a narrow gauge line for closing up wagons and proposed to add a summary 4 on this question.

The summaries arrived at are as under B hereafter.

SUMMARY.

Part A :

« 1. The prime movers mainly used in « train working on those lines of the « great railways with little traffic and « lightly loaded trains on the more im- « portant lines are steam locomotives of « varying weight, of the ordinary types.

« 2. Many of the railways also use rail « motor coaches with or without trailers, « with a steam or internal combustion « engine (explosion or Diesel) or with « accumulators, the power usually reach- « ing 100 to 150 H. P. or more, and in « addition Diesel locomotives. There is « a marked tendency to extend the use of « such vehicles. Their substitution for « heavy trains allows of higher speed and « supplementary stops between stations « without prolonging the total duration « of journeys. Their introduction, how- « ever, is of too recent date for definite « conclusions to be formed concerning « the economies resulting from their use.

« 3. It is quite usual for vehicles fitted « with an internal combustion motor to « be driven by a single man; steam loco- « motives are usually worked by two « men.

« 4. It is not possible to form any con- « clusions as to which system is to be « preferred, since only long experience « can furnish the data necessary for ar- « riving at a definite conclusion. »

Part B :

« I. — The engines whereby shunting « in small stations and certain operations « in important stations can be cheaply « performed, are :

« 1. Electric capstans, alone or in con- « junction with turntables; electric tra- « versers and traversers hauled by a cap- « stan or a « locotractor ». The traversers « are especially valuable for shunting on « lines to which access through points is « not possible.

« 2. « Locotractors » with or without a « capstan and worked by a single man. « These « locotractors » are usually fitted « with a petrol engine, sometimes with a « Diesel or steam motor or with electric « motors with accumulators.

« Certain of these systems have not yet « been used sufficiently, in practice, to « allow of a choice being made between « them.

« They can be run on any track acces- « sible to wagons.

« They can moreover be adapted for « shunting at a particular station, or « adapted for working several stations by « travelling from one station to another « on the main line.

« Petrol, Diesel and accumulator trac- « tors have the advantage over steam « locotractors » of being always ready for « work, and can be driven by the ordin- « ary station staff.

« 3. Road tractors, independent of the « track and therefore very flexible in « use. These are particularly suitable for « operations otherwise carried out with « the help of horses.

« 4. Road tractors or tractors for nar- « row gauge lines specially laid down in « shunting yards for assembling marsh- « alled wagons, without stopping marsh- « alling operations. These above all in- « crease the capacity of marshalling « yards, and provide means of reducing « damage to trucks and of reducing « working costs.

« II. — Horses have practically ceased « to be used for traction purposes. »

— The General Meeting held on the 14 May adopted this summary.

SECTION IV.

General.

President : J. Moreno, Comte de Fontao.

Vice-Presidents : S. Pretorian, Sir Walter Nugent, Dr. Ing. B. Schwarze and D. Markovitch.

Principal Secretary : E. Minsart.

QUESTION XIII.

Competition of road transport.

Effect of road competition on goods and passenger traffic and the best methods of meeting such competition, both as regards the main lines and the branches.

Preliminary documents.

1st report (America, China and Japan), by Mr. C. B. Sudborough. (See *Bulletin*, June 1929, p. 767 or separate issue No. 7.)

2nd report (Belgium, France, Italy, Portugal, Spain and their Colonies), by Messrs. Le Besnerais and Dégardin. (See *Bulletin*, November 1929, p. 2605 or separate issue No. 39.)

3rd report (British Empire), by Mr. H. L. Wilkinson. (See *Bulletin*, August 1929, p. 1287 or separate issue No. 15.)

4th report (other countries, except Germany), by Dr. A. Wasiutynsky. (See *Bulletin*, December 1929, p. 2877 or separate issue No. 43.)

5th report (Germany), by Dr. jur. H. Zietzschmann. (See *Bulletin*, January 1930, p. 191 or separate issue No. 54.)

Special Reporter : Dr. A. Wasiutynski. (See *Bulletin*, May 1930, p. 1466.)

Report of Sections III, IV and V combined.

(See *Daily Journal of the session*, No. 3, p. 5, No. 5, p. 2 and No. 6, p. 2.)

Meeting held on 7 May.

On the suggestion of Mr. Le Besnerais, *President* of Section III, and Reporter on Question XIII, Mr. Crispo, *President* of Section V, was elected President of the Meeting.

Mr. Crispo, on taking the Chair, invited speakers to be concise, owing to the complexity of the question.

Dr. A. Wasiutynski, *Special Reporter*, read the more important sections of the summary of his report, including the final conclusions embodied therein.

Dr. Zietzschmann, *Reporter*, drew attention to the fact that the International

Union of Railways (U. I. C.) had considered the question, and that certain conclusions were drawn up at Nice in March last by the Committees concerned (subject to the approval of the General Committee), following the submission of a report drawn up jointly by Germany and Switzerland.

Dr. ZIETZSCHMANN proposed the adoption of these conclusions, which he said agreed in the main with those embodied in Dr. Wasiutyński's report.

Mr. GRIMPRET (*French Government*) wished the summary to be revised so as to delete the words « unfair competition », road transport being carried on in compliance with existing laws and regulations. He also pointed out that the French Government endeavours to bring about collaboration between the two means of transport.

Mr. LANDRA (*Italian State Railways*) expressed agreement with Dr. Zietschmann in regard to the conclusions reached by the International Union of Railways, and suggested certain modifications of the conclusions contained in Dr. Wasityński's report.

Mr. JOURDAIN (*Chemins de fer Secondaires du Nord-Est, France*, Reporter on Question XVII, Section V), stated that in his opinion it would not be beneficial to place restrictions of too severe a character upon road transport organizations, which often formed a valuable auxiliary to the railways.

Mr. BIRAGHI (*Confederazione Nazionale Fascista dei Trasporti terrestri e della Navigazione interna, Italy*), stated that the road transport competition was particularly severe in short distance traffic on local lines, and that these lines were subjected to heavy charges in connection with main line junction expenses. The junction of local lines with main lines should be encouraged.

Sir Walter NUGENT (*Great Southern Railways, Ireland*) expressed the view that road traffic organisations should be placed under proper control and co-ordinated with railways; also that the two services should be placed on an equal footing as regards taxation and contribution towards the cost of road maintenance.

Mr. RUUD (*Norwegian State*) said that the question was being investigated in Norway. He stated that it was wrong in principle to divert the industrial traffic for which the railways had been constructed, and suggested that road transport should be taxed sufficiently to make good the losses on the railways.

Mr. GILLES-CARDIN (*French Government*) referred to the opinions expressed by Mr. Pourcel (*Paris-Lyons-Mediterranean*), at the Automobile Rome Congress in 1928, in regard to the co-ordination of the two means of transport, and recommended that similar conclusions should be adopted by the meeting. The Rome (Automobile) Congress also recommended the use of *containers*.

Mr. DE SOUZA (*Portuguese Government*) gave a statement of the position in Portugal, emphasizing the importance of railways from a national point of view.

Mr. GIOVENE (*Italian State*) pointed out that the U. I. C. will draw up statistics with regard to road transport competition. He suggested that mention be made in summary No. 8 of the use of containers for international traffic.

Dr. WASIUTYNSKI, *Special Reporter*, emphasised the necessity for the co-ordination of road and rail traffic, and re-

ferred to the various measures, technical, commercial, etc., recommended in his report.

Mr. Colson (*French Government*) expressed the opinion that railways and road organisations should be placed on an equal footing as regards taxes and regulations so as to enable the railways to retain their due share of the traffic.

A discussion followed in which Messrs. Landra, de Souza, Ottone (*Société Nationale de Chemins de fer et de Tramways, Italie*) and the Special Reporter took part.

The Section decided that in the French text the word « conclusions » would be substituted for « constatations finales ».

The meeting repelled an addition to article 1, proposed by Mr. Lamalle (*Belgian National Railway Company*) and worded as follows : « It is desirable that « part of the taxes with which motor « transport is to be charged, be handed « over to the railways as a compensation « for the losses they sustain through « transportation at reduced fares (espe- « cially of workmen), with which motor « transport is not burdened. »

Article 1 was adopted as is stood after a discussion in which Messrs. Pretorian (*Rumanian State*), Wasiutynski and Jourdain took part.

Article 2 was adopted with slight modifications.

Articles 3 and 4 were adopted without alteration.

After a remark made by Dr. Zietschmann, article 5 was adopted with a slight alteration to the text, proposed by Mr. Pretorian.

Articles 6 and 7 were adopted, also article 8 with an addition in connection with the use of containers for international traffic.

Article 9 was adopted, with an addition in relation with statistics.

Articles 10 and 11 were adopted, with an addition to the latter.

Article 12. — Mr. Mayer (*French Nord Railway*) suggested the following wording for the second sentence: « ... The pre- « sent legal regulation of railways in va- « rious countries takes no account of the « profound change in their situation and, « amongst others, of the fact that certain « administrations are still under the obli- « gation of running a minimum number « of trains on lines on which they are no « longer justified by the common inter- « est... »

This proposition was defeated and article 12 was adopted, the words « prejudicial to the public interest » being substituted for « unfair ».

Article 13. — The meeting adopted under this number, the suggestion made by Mr. Colson, after a discussion had taken place between Messrs. Ottone, Jourdain and Giovanola (*Tessin Railway, Italy*).

Article 14. — Article 13 of the special report was adopted and became article 14 of the summary.

PROPOSED SUMMARY FOR QUESTION XIII.

« 1. Because of the growing importance of motor road transport and its competition with railway transport, the common interest of both methods of transport, as also public interest, require an exact appreciation of their respective values as regards communication as a whole and the coordination of their services.

« To attain such an end, the present legislation relating to motor transport, which in most countries gives it the ad-

vantage over the railway, must be modified in such a way that motor transport may bear its full share of road expenses, and the public expenses of both methods of transport should be equally divided.

« 2. The system of free competition allowed in some countries, or the purely formal authorisation of regular motor services without regard to existing communications and without sufficient guarantee of the civil responsibility of the concessions-holders, is not at all in the interest of the public.

« The concession of regular motor services competing against the railway or other communications already in existence, which do not give the public any new advantages should be prohibited.

« Before granting authority, or a concession, for any regular motor service, the authorities concerned should be obliged to take into account the railways of the district and consult the owners thereof.

« 3. The indisputable advantages of motor transport, such as direct door to door services, operation by small units running frequently and rapidly, immediate organisation of a service with but little capital expenditure, are a valuable adjunct to the railway in many cases — services between stations, small and new traffic, tourist services, etc. — and everything points to the advantage of collaboration between it and the railway which is the best transport method for a great number of passengers and heavy goods.

« To assure as far as possible a close collaboration between motor and the railway for transport as a whole, the railways should have the preference for obtaining the concession of regular motor services and profit by it.

« 4. Motor transport competition is especially found in short distance traffic [up to 50 and 100 km. (31 and 62 miles)] and lessens railway traffic to an extent that depends upon the importance of the motor service, legislation concerning it and other local circumstances. In the case of passenger traffic the losses are as much as 24 % of the receipts of the main lines and as much as 60 % for lines of local interest, and in the case of goods traffic as much as 10 %.

« These figures include the losses due to the competition of irregular enterprises as well as cars and lorries owned by private individuals, which, in certain countries where motor traffic is highly developed, are much more important (four times as much in Germany) than the losses due to the competition of regular motor services.

« 5. The passenger fares of regular motor services are usually like those of 2nd class railway tickets, but in certain countries as much as 60 % higher, in others lower.

« Goods rates also are regulated by the railway rates and for short distances are usually lower, but in some countries they are several times as high.

« Such differences in rates prove that motor transport competition, especially in the case of passenger traffic, must in some cases be attributed to other than economic advantages.

« 6. To diminish motor competition the following improvements in rail transport have been carried out with good results :

« *a*) Passenger traffic :

« Organisation of local services of light and frequent trains formed of rail motor coaches and rail motor omnibuses on lines where traffic is small, with provision for frequent stops between stations;

organisation of through services on branch lines; organisation of cheap excursion trains on holidays; improvement of train connections at junctions and various timetable improvements; 3rd class sleeping cars and upholstered seats; luggage in advance, etc.;

« *b*) Goods traffic :

« Speeding up of transport by means of direct services and complete loads attached in certain cases to passenger trains; reduction of time spent on the journey and halts at stations; reforms in consigning of goods, especially in the case of parcels so as to facilitate their collection and delivery and the speeding up of their transport; more prompt forwarding of goods from transhipment stations; organisation of private depots for clients, etc.

« 7. Road arrangements to assure a complete door to door service for clients have been completed on certain railways under the form of motor and motor lorry services organised by the railway company itself or by means of agreements with private enterprises.

« 8. The use of containers which can be loaded onto both wagons and motor lorries is increasing rapidly on some railways and facilitates direct transport for small traffic.

« The results of the international trials to select standard types may facilitate collaboration between rail and road.

« 9. A great many railway companies have organised or are organising regular motor services as subsidiary undertakings which are to act as feeder services or to run parallel with their own lines to relieve local congestion. Some of these railway companies (Pennsylvania Railroad — Great French Companies — Dutch Railway Companies — Swiss Federal Railways, Italian State Railways) have confided the running of their regular motor services as well as the cartage services and all business resulting therefrom, to companies organised as independent undertakings on capital provided by the railway. According to the information received these two types of subsidiary undertaking give promise of excellent results in the matter of the collaboration of road and rail and it is to be hoped that regular statistics will be established on this and other matters.

« 10. Mixed services of direct transport by railway and regular motor services belonging to the railway as well as other enterprises with possible choice of route have been organised by several railway companies in the United States as well as in certain cases in Europe. Such services seem likely to develop.

« 11. Many reductions in passenger and goods rates have been made by all the railway companies, especially in the case of short-distance traffic up to 100 km. (62 miles) in certain cases, or for certain kinds of goods where there is competition.

« The unequal conditions in which the railways stand as compared with motor transport in the matter of the obligation to transport and strict adherence to rates have obliged several Governments (Denmark, Holland, Italy, Rumania, Switzerland, Czechoslovakia) to allow special agreements to be made between the railway and its clients for the permanent transport of fixed quantities of goods at reduced rates. This measure, applied on condition that the rates decided upon correspond to the reasonable cost of transport by motor lorry and assure the railway a profit compared with cost price, has proved efficacious, and it appears to be worthy of general application.

« 12. Motor road transport has taken from the railways the monopoly of assuring rapid and economical communication between one place and another. The legislation concerning the railways, in force at present in different countries, does not take into consideration the great change which has taken place regarding them. It is to be hoped that these legal failings, one of the chief causes why road competition is often prejudicial to the public interest, will be made good and that the use of a less stringent rating system on the railway will contribute to placing road and rail transport upon an equal footing. By this means their close collaboration for the public good will be made possible.

« 13. The Railway Congress considers that railways still constitute the most economical means of conveying bulk traffics over any distance, and for the transportation of goods in general over long and medium distances, and that it is to the public interest that such traffics should be retained by the railways. The railways have to contend with the following difficulties :

« *a*) Taxation, in many countries in excess of that imposed on any other form of transport;

« *b*) Legal and other obligations, which are often more injurious to the railways than beneficial to the public.

« In order to avoid serious consequences, economic and financial, it is necessary to remove these two causes of inequality.

« In regard to *a*, the Congress recommends that the various modes of transport be placed on an equal footing as regards taxation, the cost of road maintenance, and the amortisation of invested capital.

« It is suggested that the contribution of motor transport towards road costs be collected in the form of annual taxes, either on the vehicles themselves, their fuel, or their tyres, as is already done in certain countries.

« In regard to the second point (*b*), the Congress considers that in view of the loss of the monopoly of long distance transport which the railways enjoyed before the development of motor transport, the present restrictions relative to the fixing of rates, and their date of operation should be so modified as to place the railways on an equal footing with their competitors.

« The Congress considers that if this concession be made, the railways should organise lorry transport in order to give door to door services, similar to those of their competitors.

« 14. The information received from the railway companies themselves and other documents prove that motor road transport competition which has increased very much on certain railways by reason of local circumstances, has been sufficiently diminished by other companies by the speeding up and improving of railway transport, by the organisation of regular motor services as a subsidiary undertaking and by mixed services of direct transport as well as by other technical and rates measures of the railway companies supported by Governmental legislative measures.

« Projects of legal reform with the object of regulating the obligations and expenses of the motor services and the lessening of certain fundamental railway obligations have been promised by several Governments.

« These examples make possible the hope that motor road transport, when coordinated, will become a powerful ally

of the railway and assist in completing and developing communications for the benefit of the community.

« The Railway Companies and the Congress should be strongly recommended to study this problem further in order to attain such an end. »

Meeting held on 8 May.

In opening the proceedings, Mr. CRISPO, *President* of Section V, stated that the meeting had been called because the publication of the summary drawn up on the 7 May had shewn that certain modifications were necessary. Messrs. COLSON, WASIUTYNSKI and ZIETZSCHMANN had together drawn up a revised text.

The less important modifications were unanimously adopted.

In regard to the principal modifications, the Sections decided, on the proposition of Messrs. ZIETZSCHMANN, LANDRA, BEGHIN (*French Departmental Railways*), DE SMEDT (*Belgian National Light Railway Company*), to call attention to the necessity for equalising the burdens borne by road transport and railway transport in respect of hours of duty of the men, as well as responsibilities in regard to transportation. Further, the users ought to be assured that the road transport organisations are in a position to assume this responsibility. The meeting drew up the text of these additions.

In regard to article 13, Mr. BIRAGHI proposed a further revision, supported by Mr. WASIUTYNSKI, indicating that the total cost of railway transport, including the expenses at present borne by the public, remains the most advantageous whatever the distance.

Mr. COLSON was of opinion that there was no doubt but that for short distances road transport was the cheaper.

Mr. BIRAGHI supported by Messrs. WASIUTYNSKI, LANDRA and OTTONE, stated that he had only taken into account the rail section of the transport, as he considered that the cost of transportation from the house to the station was included in the cost of production.

The wording proposed by Mr. BIRAGHI was adopted with a modification covering these remarks.

Following the discussion which took place at the General Meeting held on the 10 May, the summary on Question XIII was agreed upon as under, the transposition of items 12 and 13 was agreed upon, the latter being completed by the addition of the words : « where they are prepared to take advantage of it ».

REVISED SUMMARY ON QUESTION XIII.

« 1. Because of the growing importance « of road motor transport, and its com- « petition with railway transport, the « common interest of both methods of « transport, as also the public interest, « requires an exact appreciation of their « respective values as regards communi- « cations as a whole : also the co-ordina- « tion of their services.

« To attain this end it is necessary to « modify the present position of road « motor transport, which in most coun- « tries gives it an advantage over the rail- « way, to make road transport bear its « full share of the road expenses of « which it is the cause, of civil and com- « mercial responsibilities and of the pre- « scriptions in respect of hours of duty of « the personnel : in short that the public « charges shall be equally divided be- « tween these two methods of transport.

« 2. The system of free competition « allowed in some countries, or the pure-

« ly formal authorisation of regular mo-
« tor services without regard to existing
« communications and without sufficient
« guarantee of the civil responsibility of
« the concessions-holders, is not at all in
« the interest of the public.

« The concession of regular motor ser-
« vices competing against the railway or
« other communications already in exis-
« tence which do not give the public any
« new advantages should be prohibited.
« Before granting authority, or a con-
« cession, for any regular motor service,
« the authorities concerned should be
« obliged to take into account the rail-
« ways of the district and consult the
« owners thereof.

« 3. The indisputable advantages of mo-
« tor transport, such as direct door to
« door services, operation by small units
« running frequently and rapidly, imme-
« diate organisation of a service with
« but little capital expenditure, are a va-
« luable adjunct to the railway in many
« cases — services between stations, tou-
« rist services, etc., — and everything
« points to the advantage of collaboration
« between it and the railway, which is
« the best method of transport for large
« numbers of passengers and quantities
« of heavy goods.

« To assure as far as possible a close
« collaboration between motor transport
« and the railways for transport as a
« whole, the railways should have the
« preference for obtaining the concession
« of regular motor services where they
« are prepared to take advantage of it.

« 4. The competition of road transport
« is greatest over short distances [up to
« 50 or 100 km. (31 to 62 miles)] and
« causes the diminution of railway traf-
« fic, varying according to the number
« of the road vehicles and other circums-
« tances; cases have been stated in which
« this loss has reached 24 % of the pas-
« senger receipts of trunk lines, and up
« to 60 % of those of local lines, and
« 10 % of goods on trunk lines.

« These figures include the losses due
« to the competition of irregular enter-
« prises, as well as cars and lorries own-
« ed by private individuals, which, in cer-
« tain countries where motor traffic is
« highly developed, are much greater
« (four times as much in Germany)
« than the losses due to the competition
« of regular motor services.

« 5. The costs of passenger transport
« on regular lines of motor omnibuses
« are usually about the same as second
« class on the railways, but in certain
« countries they are 60 % higher, in cer-
« tain others they are lower than this.

« Goods rates for road transport are
« based on railway operations and are,
« for short distances, generally lower
« than the latter, but in certain countries
« several times greater.

« The diversity of these charges proves
« that the road transport competition,
« particularly for passenger traffic, must
« in some cases be attributed to causes
« other than economy.

« 6. To lessen road motor competition,
« the following improvements of rail
« transport have been successfuly appli-
« ed.

« a) *Passenger traffic.*

« Organisation of local services of light
« and frequent trains in the form of rail
« motor cars for lines of light traffic,
« with provision for numerous stops
« between stations, organisation of direct
« through trains over branch lines; or-
« ganisation of trains at reduced costs at
« holiday times, improvement of train

« connections at junction stations, sleeping « ing cars, and upholstered seats in third « class carriages, delivery of luggage, etc.;

« b) *Goods traffic.*

« Speeding up of transport by means « of direct services and complete loads, « in certain cases attached to passenger « trains; the reduction of time on the « journey and stops at stations; reforms « in the consigning of goods, especially « of parcels, with the object of facilitating « their collection and delivery, and « speeding up their conveyance; a more « prompt forwarding of goods from « transhipment stations; organisation of « private depots for traders, etc.

« 7. Road arrangements for ensuring « a complete door to door service have « been completed on certain railways in « the form of motor lorry services organised by the railway company itself, or « by means of agreements with private « undertakings.

« 8. The use of containers, which can « be loaded either on wagons or motor « lorries, is increasing rapidly on some « railways and facilitates direct transport « for « smalls » traffic. The results of « the international trials to select standard types may facilitate collaboration « between rail and road.

« 9. A great many railway companies « are organising regular motor services « as subsidiary undertakings, to act as « feeder services, or to run parallel lines « to relieve local congestion. Some of « these railway companies (Pennsylvania « Railroad — the Great French Companies — Dutch Railway Companies — « Swiss Federal Railways — Italian State « Railways) have entrusted the running « of their regular motor services as well « as the cartage services, and the investigation of questions connected therewith, « to companies that they have organised « as independent undertakings on capital « provided by the railway. According to « the information received these two « types of subsidiary undertaking give « promise of excellent results due to the « collaboration of road and rail, and it « is to be hoped that regular statistics « will be established on this and other « matters.

« 10. Mixed services of transport by « rail and regular lines of motor buses « belonging to the railways, or other undertakings, with optional itinerary, have « been organised by several railways in « the U. S. A. as well as in Europe and « appear to be developing.

« 11. Numerous reductions of passenger fares and goods rates have been « made by many of the railways, particularly for journeys up to 100 km. « (62 miles) for certain competitive traffics.

« The unequal position of railways in « relation to road transport because of « their obligation to adhere strictly to « fixed tariffs has compelled several governments, Denmark, Holland, Italy, « Rumania, Switzerland, Czechoslovakia, « to admit special agreements between « the railways and traders for transport « at reduced rates, for a fixed period, of « agreed quantities of goods. This measure has proved successful so long as « the rates agreed on correspond with « the reasonable cost of transport by « lorry, and give the railways something « in addition to the actual cost. It appears desirable to bring this system « into general application.

« 12. The Railway Congress emphasizes « the fact that the rail remains the most « economical form of transport having

« regard to actual cost, between the points « it serves, and beyond that it is necessary in the public interest that railways « should retain their traffic. Railways « have to contend with the following difficulties :

« I. They are subjected to legal obligations or regulations of a very onerous « character.

« II. They are burdened in many countries with financial and fiscal charges « higher than those of any other mode « of transport.

« In order to avoid serious consequences, economic and financial, it is necessary to remove these two causes of inequality.

« 13. Road transport has taken from « the railways the monopoly of cheap « and rapid communication which they « formerly possessed in the localities they « served. The present legal regulation « of railways in the different countries « takes no account of the profound « change in their situation in this respect.

« It appears to be necessary to lessen « the burden of this legislation, which « is one of the principal causes of successful road motor competition, which « is often prejudicial to the public interest, also to make rating systems more « flexible in order to place railways on « the same footing as road motor organisations and to facilitate close collaboration between the various routes to « the profit of the common interest.

« 14. The information supplied by the « administrations, and other documents, « prove that the competition of road « transport, which is very serious on certains systems because of local circumstances, has been lessened on other systems by the improvement and speeding up of rail transport, by the organisation of regular lines of automobiles « forming auxiliary services and by mixed services of direct transport as well « as by other measures, technical and « commercial, of the railway administrations, supported by government regulations.

« Projects of legal reform with the object of regulating the obligations and « charges of road motor services as well « as the easing of certain fundamental « obligations of the railways have been « reported by several administrations.

« These examples make possible the « hope that motor transport, duly co-ordinated, will become a powerful ally « of railways and assist in completing « and developing communications for the « benefit of the community.

« With this end in view, the further « study of the question by the administrations and by the Congress is strongly « recommended. »

— In this final form, the summary was adopted by the General Meeting.

QUESTION XIV.

Use in railway work of machines for simplifying statistical and accountancy work.

Preliminary documents.

1st Report (America, the British Empire, China and Japan), by Mr. W. E. Eppler. (See *Bulletin*, May 1929, p. 507 or separate issue No. 4.)

2nd Report (other countries, except Germany), by Messrs. Bruneau and Boistel d'Welles. (See *Bulletin*, November 1929, p. 2499 or separate issue No. 37.)

3rd Report (Germany), by Dr. Ing. K. Tecklenburg and Mr. Gaier. (See *Bul-*

letin, March 1930, p. 951 or separate issue No. 68.)

Special Reporter : Dr. Ing. Tecklenburg. (See *Bulletin, May* 1930, p. 1493.)

Report of Section IV.

(See *Daily Journal of the Session*, No. 2, p. 6, and No. 6, p. 2.)

Dr. Ing. Tecklenburg (*Special Reporter*) read extracts from his resumé of the reports received from Mr. W. E. Eppler, Messrs. Bruneau and Boistel d'Welles, and Messrs. Tecklenburg and Gaier, including the conclusions he had reached after a careful study of these documents.

Mr. Bruneau (*Reporter*) expressed his agreement with the conclusions of the special reporter, but spoke of the variations in goods nomenclature, which constituted an obstacle to the extension of the use of machines in preparing statistics of international traffic.

Dr. Tecklenburg replied that he was speaking of future developments, but that the difficulty referred to by Mr. Bruneau could be gradually overcome.

Mr. Hondl (*Czechoslovakian State Railways*) supported this view, stating that the Czechoslovakian State Railways had already adopted the perforated card system for three special items of international traffic.

Mr. Bruneau asked for information in regard to the extent to which the perforated card system had been adopted in Germany for statistics of international traffic.

Mr. Gaier (*Reporter*) stated that the trials of these machines for traffic records had been in hand in Germany since 1926 and had given very satisfactory results. The German Railways had not, however, extended these trials to the whole of their system but had experimented concurrently with another process (without perforated cards) for small consignments on which the freight charge does not exceed three Reichsmarks. It was anticipated that this system would simplify, accelerate and cheapen the work.

Mr. Baillargues (*Paris-Orleans Railway*) asked whether in addition to indirect advantages (such as more rapid issue of tickets, possibility of installation where space is restricted, etc.), the ticket-issuing machines used in Germany had effected direct monetary savings.

Mr. Gaier stated in reply that ticket-issuing machines of recent design showed a considerable advance over the earlier models and had simplified and speeded up the primary accounting and statistical records, with the result that considerable staff economies had been realised.

In answer to Mr. Newton (*London & North Eastern Railway*), Mr. Gaier said that ticket-issuing machines manufactured by the A. E. G. and Siemens and Halske had given satisfactory results and there was little, if any, difference between the two designs.

At the suggestion of the President, the conclusions embodied in the special report were unanimously adopted :

As the result of a discussion which took place at the General Meeting of the 10 May the sentence hereafter in item 7 : « Their advantage lies in the possibility of carrying out investigations » was modified by adding the word « certain » before the word « investigations ».

The final summary thus runs as follows :

SUMMARY.

« 1. The efforts to make the operations « necessary for the carrying out of cor-

« respondence, accounting and statistical « work more economical, are a part of « the great question of measures to be « taken for rationalization. The objec- « tive may now and then be reached by « pure and simple rationalization, but « more generally by rationalization « coupled with mechanization.

« 2. In order that when choosing the « means, the appropriate ones may be « selected, it appears worthy of recom- « mendation, that every Administration « should set up a special department « whose duty should be to investigate « uniformly the basic questions concern- « ing rationalization and mechanization « and which, with its accumulated know- « ledge, should stand behind the detach- « ed departments in an advisory capa- « city.

« 3. The common axiom governing « mechanization should be : The intro- « duction of office and similar technical « apparatus is justified when, after tak- « ing into consideration purchase and « high amortization costs due to rapid « depreciation, savings are made or in- « direct advantages, such as the quick- « ening or improving of work, are « gained such as will offset the costs.

« 4. Accurate judgment on the econ- « omic results of mechanization presup- « poses the existence of comparative ac- « counting. The prompt production of « the costs incurred by the introduction « of machines and the working out of « the costs of mechanical methods should « therefore have careful attention.

« 5. The degree to which machines are « occupied has considerable influence on « the cost of mechanical operation. The « policy of keeping the machines fully « employed is therefore of the utmost « importance in the organization of the « work; in many cases, the centraliza- « tion of work will be a preliminary step.

« 6. The office machines, mechanical « installations and similar apparatus at « present to be found in the use of the « railway administrations, are of extra- « ordinary diversity; on account of the « continued progress in this sphere, each « administration must in future choose « in the light of the common point of « view previously developed, the ma- « chines which are best suited to its « particular needs and operations; an « interchange of ideas at a later date is « to be recommended, on the experience « accumulated, especially that concern- « ing machines built solely for railway « purposes such as ticket printers and « the like.

« 7. An advance of the very greatest « importance in statistical and account- « ing operations is to be seen in the in- « troduction for statistical purposes of « machines (the so-called perforated card « machines). Their advantage lies in « the possibility of carrying out certain « investigations more rapidly and more « accurately and in the possibility of « deepening the researches and opening « up fields of enquiry which could not « be reached by purely manual methods. « Enquiry is therefore possible into « questions which, up till now, have « been closed to investigation, especially « on the economic side, and this makes « possible the elucidation of important « scientific problems regarding railway « operation (cost problems).

« 8. The wider general introduction of « the perforated card system will provide « advantageous possibilities for interna- « tional co-operation, especially in the « matter of reciprocal accounting and « perhaps for the question of interna- « tional traffic statistics. It is recom-

« mended that developments in this « direction should be watched, and that « later, at the appropriate time, they « should form the subject for further « discussion. »

— This summary was adopted by the General Meeting held on the 10 May.

QUESTION XV.

Co-operation of the staff towards increased efficiency and its participating in the profits.

Preliminary documents.

1st report (America, the British Empire, China and Japan), by Mr. C. C. Cook. (See *Bulletin*, Juli 1929, p. 1125 or separate issue No. 12).

2nd report (Belgium, France and their Colonies), by Messrs. Soulez and Bloch. (See *Bulletin*, November 1929, p. 2533 or separate issue No. 38).

3rd report (other countries), by Messrs. R. Marin del Campo and J. Canovas del Castillo. (See *Bulletin*, January 1930, p. 215 or separate issue No. 55.)

Special Reporter : Mr. R. Marin del Campo. (See *Bulletin*, May 1930, p. 1504.)

Report of Section IV.

(See *Daily Journal of the Session*, No. 4, p. 7, No. 5, p. 5 and No. 6, p. 2.)

Mr. Marin del Campo (*Special Reporter*) read extracts from his report, emphasising the importance of obtaining the co-operation of the staff in order to realise the maximum efficiency of the railways.

Mr. Soulez (*Reporter*) said that the report which he had drawn up in collaboration with Mr. Bloch had been limited to an examination of the various systems of bonuses for output and the participation of the staff in the profits. In order to deal with the question on general lines it would be necessary to consider many additionals factors, such as rationalization, technical education, pension and insurance funds, etc.

Mr. Djouritchitch (*Jugoslav State*) expressed the view that the term « profits » must be taken in a limited sense, as a railway (State), built in the public interest, ought not to make profits.

Mr. Bloch (*Reporter*) explained the methods adopted by the French Reporters, who had to deal with a programme drawn up by the Permanent Commission. He defended the objective character of the report and mentioned that the international organisations in all their publications furnished precise data and gave the results of experience.

Mr. Jacquet (*French Government*) considered that the question was psychological rather than mathematical. The staff wished to co-operate in improving the railway and he supported the Special Reporter's proposition that the matter be deferred until the next Congress.

Mr. C. T. Cramp (*British Government*) said that the question appeared to be closely allied to No. XVI, *viz.* « Training of railway staff ». He considered that, in view of the competition of road transport, the co-operation of the staff was vital to the prosperity of railway companies, and stated that in Great-Britain the men had shown an increasing desire to help the Administrations, and frequenlty put forward suggestions for regaining traffic which had been diverted to road transport. He recommended that Railway Administrations should explain to the

men the difficulties of the present situation and indicate how they could assist in overcoming them.

Mr. Bloch agreed with the previous speaker that the question of collaboration was a very important one, and that if it had been embodied in the programme, the French Reporters could have given a considerable amount of information on the subject.

Mr. Pretorian (*Rumanian State*) suggested that the question be considered under three heads, viz. :

1. Salaries, wages and overtime;

2. Steps taken to retain the staff in the service;

3. Steps taken to encourage the staff to increase their output of work.

Any profit made by railways should as a general rule be applied to fare and rate reductions, but a part of it should go to the staff. The Rumanian Railway Act provided that 25 % of the profit should be paid to the staff.

Mr. Barth (*French Est Railway*) said that organisation and participation are two different things and professional training still another. In is opinion, the French Reporters interpreted the question in the right way.

Mr. Poirel (*French State*), speaking from the men's point of view, claimed that the employees should be allowed to collaborate in the management of the railways.

Mr. Biscoe (*North Western Railway of India*) referred to the great difficulty experienced by Indian Railway Administrations in gaining the co-operation of native railwaymen, the majority of whom were illiterate, and asked whether any of the Delegates from Belgian or other Administrations who employed native personnel could state how they had dealt with similar situations.

Mr. Bloch read extracts from his report in order to demonstrate that the French reporters had not lost sight of the general question of co-operation, and pointed out that the question of rationalization was not on the agenda.

Mr. Marin del Campo stated that at the Congress of the International Federation of Transport Workers on the 28th April last, the question of staff participation had been discussed. He had gathered from the conclusions reached at that Congress that the men were of opinion that the question should be dealt with on the lines he had suggested in his report . He said the view was widely held that the question should be deferred, and put forward the following proposition :

1. That the matter has not been sufficiently investigated and should be referred back for further examination, after settlement of the precise form in which the Question should be put.

After a prolonged discussion on the interpretation of the Question : « Co-operation of the staff towards increased efficiency, and its participation in the profits », discussion in which took part Mr. Grimpret, who defended Mr. Marin del Campo's proposal, Messrs. Soulez and Bloch, and Mr. Pretorian, the following resolution set forth by the President and amended by Mr. Djouritchitch, was carried :

« The Fourth Section finds that the Question has been interpreted differently by the reporters, with the result that the replies received from the various Adminis-

trations do not contain sufficient data to form the basis of definite conclusions. In these circumstances the Section recommends that the Question be investigated further and placed on the Agenda for the next Congress. »

Meeting held on 9 May.

The PRESIDENT reminded the meeting that it had been decided to recommend that the subject be included on the Agenda for the next Congress, and that it remained to consider the form in which the new questionnaire should be framed.

Mr. MARIN DEL CAMPO submitted a revised summary which, at the request of the PRESIDENT, he had drawn up in the hope of meeting the views of the other Delegates.

Mr. PRETORIAN considered that this revised summary was couched in terms of too general a character, and submitted a further alternative text.

Discussion was then suspended while a further formula was drawn up.

At the resumption of the debate, Mr. SOULEZ expressed the view that the questionnaire should be carefully drawn up in order to give future reporters a well defined programme.

Sir Josiah STAMP (*London Midland & Scottish Railway*) stated that in his opinion Mr. PRETORIAN's proposal was in reality embodied in the text of the special report.

Mr. PRETORIAN considered that the expression « politico - economico - social » should be eliminated from Mr. Marin del Campo's proposition, in order to obviate placing certain Administrations in a difficult position.

Mr. BLOCH suggested that a sub-committee should be formed for the purpose of drawing up a revised questionnaire.

Sir Josiah STAMP suggested that the words « interest in the results of railway working » should be substituted for the words « participation in profits », as the latter term was likely to give rise to misunderstanding. He indicated also that it would be necessary to consider departmental results as well as nett results of railway working.

Mr. DJOURITCHITCH and Mr. MARTIN (*Paris-Orleans Railway*) spoke in support of the proposal to appoint a committee to deal with the point.

After further discussion it was agreed that a committee composed of the Special Reporter, and Messrs. SOULEZ, BLOCH, DJOURITCHITCH, CANOVAS DEL CASTILLO and Sir Josiah STAMP, under the presidency of Mr. PRETORIAN should draw up a new text.

Discussion was suspended for an hour, after which Mr. PRETORIAN read the new questionnaire the Committee had drawn up.

Mr. NOVARRO (*Portuguese Colonial State Railways*) suggested that the text should be drawn up in the form of a suggestion to the Permanent Commission.

Sir Josiah STAMP said that although the Permanent Commission had the right of decision, that body would naturally be influenced by the recommendations of the meeting.

The following text was eventually agreed :

SUMMARY.

« The Fourth Section considers that, in « spite of the efforts made by the Repor-

« ters, the information received from dif-
« ferent Administrations on the subject
« of Question XV is not conclusive.

« In these circumstances the Section
« suggests to the Permanent Commission
« that the matter be referred back for
« further investigation and inclusion on
« the agenda for the next Congress, in the
« following terms, and expresses the hope
« that the next Congress, by taking into
« account the data already received and
« the further information which will be
« collected, will be in a position to make
« suitable recommendations :

« Participation of the staff in the re-
« sults of working, under the various
« aspects of the problem of treatment
« during each year, with the view of
« enlisting the men's close and harmo-
« nious co-operation in obtaining the
« maximum output and furthering the
« prosperity of the undertaking, at the
« same time giving railway users the best
« possible transportation at minimum
« cost. Methods of any kind will be con-
« sidered and particularly those hereaf-
« ter :

« 1. Methods of interesting the staff in
« the partial or complete results of rail-
« way working.

« 2. Co-operation of the staff in the
« working of the undertaking (setting up
« sectional councils and suggestion sche-
« mes, etc.).

« 3. Methods of binding the staff to
« the railway service (social work, pen-
« sions, housing schemes, medical bene-
« fits, insurance, etc.).

« 4. Technical instruction. »

— At the General Meeting held on the 10 May, Mr. Marin del Campo asked what were the English and German translations of the words « traitement du personnel ». He considered that it should be made quite clear that the words were intended to cover not merely the remuneration of the staff, but also the way in which the staff should be treated in a general way.

On examination of the text it was found that the German word was sufficiently explicit.

In regard to the English version it was agreed, on a proposition made by Sir Josiah Stamp, that the word « treatment » should be substituted for the words « staff remuneration ». Subject to this alteration (1), the summary was adopted by the general Meeting.

QUESTION XVI.

Methods followed in training of staff, professional, technical and ordinary working grades.

Preliminary documents.

1st Report (all countries, except those hereafter), by Mr. Mereutza. (See *Bulletin*, August 1929, p. 1453 or separate issue No. 17.)

2nd Report (Belgium, France, Holland, Italy, Portugal, Spain and their Colonies), by Mr. Barth. (See *Bulletin*, September 1929, p. 1905 or separate issue No. 26.)

3rd Report (America, the British Empire, China and Japan), by Mr. L. C. Fritch. (See *Bulletin*, August 1929, p. 1315 or separate issue No. 16.)

4th Report (Germany), by Dr.-Ing. B. Schwarze. (See *Bulletin*, April 1930, p. 1197 or separate issue No. 73.)

Special Reporter : Mr. Barth. (See *Bulletin*, May 1930, p. 1526.)

(1) Already included in the above text.

Report of Section IV.

(See *Daily Journal of the Session*, No. 7, p. 5 and 9, p. 4.)

M, BARTH (*Special Reporter*) read a brief abstract of his report, dividing the subject under three heads, *viz.*:

a) Selection of candidates;

b) Preliminary instruction;

c) Instruction given to men already in the service.

In regard to *a*) Mr. BARTH stated that most of the Administrations put the candidates through an examination, competitive or otherwise, and that in certain cases candidates for admission into the upper grades of the service have to produce diplomas : also that psycho-technical tests had been adopted with good results by the Société des Transports en commun, at Paris, also by the Czechoslovakian and the German State Railways.

In regard to instruction given prior to entry into the railway service, it appeared that the railways who subsidised and made use of private institutions, were dropping this arrangement, and it certainly seemed that direct instruction by the railways themselves was a better system. This instruction varied according to circumstances, and consisted of one or more training periods, or a course in a school in which the candidates were grouped, the former method being used mainly for candidates for higher posts.

The training of the staff was of very great importance from two points of view, output and safety : some administrations subsidise mutual improvement classes, others provide libraries and periodicals for the use of the staff. On many of the railway systems the men receive direct instruction on the subject they need to master, this instruction being given either at the stations, depots, etc., or in schools founded for the purpose by the administrations. In particular, some noteworthy schools exist in France, Germany, Sweden, Denmark, British India, Australia, etc.

The cases reported (instruction in schools or at stations, depots, etc.) refer to all categories of the staff.

Mr. BARTH concluded by reading a draft summary which he had drawn up in collaboration with Mr. MEREUTZA and Dr. SCHWARZE (*Reporters*).

Mr. POIREL (*French Government*) submitted a proposition that the enquiry should be pursued and recommending that in countries where military service is obligatory, ex-apprentices should, on the termination of their military service, be given employment in their respective trades by the railways on which they had previously served.

Mr. BARTH supported this proposition subject to two conditions : *a*) that the apprentices have given satisfaction and *b*) that vacancies exist.

Mr. MEREUTZA drew attention on an important point : the control of the instruction or rather of the results obtained thereby. In regard to Mr. POIREL's proposition, he thought that all the railway administrations took back their apprentices if vacancies existed. He moved the adoption of the summary submitted by the Special Reporter.

Mr. POIREL stated that in his opinion it would be difficult for ex-apprentices to find employment except on the railways and that therefore there was a moral obligation to take them back.

Mr. CRAMP (*British Government*) spoke in regard to the necessity for giving adequate instruction to men who have to

work alone, and emphasised the necessity for *practical* instructions as to the steps to be taken in the event of accidents or other emergencies.

Mr. Barth suggested the modifications of Mr. Poirel's proposition to indicate that the railway administrations should give priority to ex-apprentices who apply for employment.

Dr. Bruno Schwarze referred to the successful development in Germany of the psycho-technical system of tests, more than 120 000 examinations of this kind having been made with very satisfactory results. He emphasised the importance of appointing suitable teachers, and of extending instruction to the whole of the railway personnel.

Mr. Landra (*Italian State Railways*) spoke in support of the summary submitted by the Special Reporter, and stated that in his view the railways should give theoretical and practical instruction in accordance with the varying requirements in each country.

Mr. Hondl (*Czechoslovakian State*) referred to the development in Czechoslovakia, since the year 1923, of psycho-technical examinations, and said that the results were remarkable. He would have liked to propose the inclusion of this subject on the agenda for the next Session, but in view of the programme already drawn up he assumed that it would be dealt with under the heading of « The scientific organisation of railway work. »

Mr. Honold (*Deutsche Reichsbahn Gesellschaft*) spoke in regard to the necessity for giving theoretical instruction in addition to practical training, otherwise the new railwaymen would learn to do the work in the way they saw it done, even though it might be incorrect. Further, it should be arranged that each employee should be under instruction for a certain number of hours during a fixed period, and that his attendance at these courses should be duly verified.

Mr. Biscoe (*North Western Railway, India*) supported Mr. Honold's views, and mentioned the difficulty experienced with Indian native railwaymen, to whom all instructions have to be conveyed orally. There were schools for supervisors, as well as for the ordinary staff, and care had to be taken to see that the regulations were understood by the men.

Mr. Barth proposed two additions to meet the points made by Mr. Cramp and Mr. Poirel.

A third modification was proposed by Mr. Pretorian (*Rumanian State*) to emphasise the necessity of ensuring that men make good use of the instruction they receive.

The summary, thus completed, was adopted by the Section.

SUMMARY.

« The information furnished in reply « to the questionnaire indicates that staff « instruction is well organised on the « majority of the Railways.

« 1. Railway Administrations should « take particular care to select candi- « dates possessing the necessary qualifi- « cations for the posts to be filled. To « this end, candidates should be requir- « ed to pass an examination in general « knowledge, or furnish a school certi- « ficate. Special examinations, includ- « ing psycho-technical tests, should how- « ever, be instituted if necessary. Se- « veral Administrations have made use « of such tests with very satisfactory re- « sults; their extension is recommended.

« 2. Preliminary instruction should « be given before the appointees com- « mence work. This instruction will, of « course, vary in character and duration, « for ordinary workmen, artisans and « clerks. With this end in view, most « of the Administrations have created in- « stitutions of a more or less perfected « kind, particularly as regards appren- « ticeships. It is recommended that Ad- « ministrations should take care to give « their manual workers at least as good « a training as that afforded by other in- « dustries in their respective countries.

« It is also recommended that all Rail- « way Administrations in countries « where military service is obligatory « should give priority to their ex-ap- « prentices who, on the termination of « their military service, submit applica- « tions for employment in any posts that « may be vacant.

« 3. In view of the information fur- « nished by the various Administrations « and the trials already carried out, it « is recommended that employees should « be given regular and methodical in- « struction in regard to new regulations, « new developments in their respective « spheres of work, and be taught to carry « out their work economically (*i. e.*, ob- « viating waste of time or materials) « punctually, and with safety to them- « selves, the public, and the rolling « stock, etc. The employees should be « required to serve probationary periods, « either in technical schools, or by in- « struction at the stations, depots, etc., « using travelling schools (wagons- « écoles), magic lanterns, and the cine- « matograph. Good results have been « obtained from instructional cinemato- « graphs, and their use is recommended.

« It is strongly recommended that men « who work alone should receive careful « instruction, and further that pract- « ical training should be given as re- « gards the steps to be taken in the event « of accidents or other emergencies.

« Furthermore, it is necessary to test « the men from time to time to see that « they have assimilated the knowledge « imparted to them, and are making good « use of it.

« 4. It is also recommended that sup- « port should be given, as far as possible, « to private institutions which provide « tuition for the men, and attention is « drawn to the method of teaching by « correspondence, which has been suc- « cessfully adopted by some Administra- « tions.

« 5. Finally, men of particular merit « should have an opportunity of being « tested in regard to their powers of « judgment and ability to command, with « a view to promotion to the higher « grades. »

— This summary was adopted by the General Meeting of the 14 May.

SECTION V.

Light railways and Colonial railways.

President : Dr. A. Crispo.

Vice-Presidents : L. Jacobs, Youssef Risgallah Bey, O. Lagasse and M. Gimenez Lombardo.

Principal Secretaries : A. Allard and E. Hennig.

QUESTION XVII.

Penetration railways.

Construction :

a) Penetration railways in new countries;

b) Feeder railways in all countries.

Preliminary documents.

1st report (all countries, except those hereafter), by Mr. E. Mellini. (See *Bulletin*, November 1929, p. 2637 or separate issue No. 40.)

2nd report (America, the British Empire, China and Japan), by Sir Ashley Biggs and Mr. C. W. Lloyd Jones. (See *Bulletin*, August 1929, p. 1487 or separate issue No. 18.)

3rd report (Belgium, France, Holland, Portugal, Spain and their Colonies), by Mr. Pierre Jourdain. (See *Bulletin*, December 1929, p. 2925 or separate issue No. 44.)

Special Reporter: Mr. P. Jourdain. (See *Bulletin*, May 1930, p. 1536.)

Report of Section V.

(See *Daily Journal of the session*, No. 2, p. 7, No. 4, p. 6 and No. 6, p. 2.)

Mr. Jourdain *(Special Reporter)* gave a summary of his report and proposed that for purposes of discussion the question be divided into two parts :

1. Penetration railways;
2. Feeder railways.

As regards penetration railways, Mr. Jourdain considered that particular attention should be devoted to the question of gauge.

Mr. Lloyd Jones *(Reporter)* remarked that the choice of methods of penetration was determined by economic, political and financial considerations. In choosing the gauge to be adopted, account must be taken of the probable future economic development of the country.

Mr. Watson *(London & North Eastern Railway)* considered that the choice of gauge depended on the proportion between the local traffic — passengers and goods — and the longer distance traffic.

Mr. Mellini *(Reporter)* remarked that the 0.95-m. (3 ft.-1 3/8 in.) gauge of the Colonies of North Africa was chosen by the Italian Government because that gauge had been adopted by Southern Italy.

Mr. Jacobs *(Belgian National Light Railway Company)* referred to the adoption of the 1.067-m. (3 ft.-6 in.) gauge for the Cape to Cairo Railway. He reported that the Belgian National Light Railway Company had almost completed the unification of the gauge of its lines, having adopted the 1-m. (3 ft.-3 3/8 in.) gauge.

Mr. de Souza *(Portuguese Government)* was of the opinion that on the Portuguese colonial railways unification of gauge should be the aim. In the North of Portugal it was not possible to adopt the standard gauge for light railways in view of the ondulating nature of the country.

Mr. Lagasse *(Catalan Railways)* wished to have the opinion of delegates present, with regard to the advantages, from the point of view of stability, of the 1.067-m. gauge over the metre gauge.

Mr. Jourdain, replying to Mr. Lloyd Jones, was of the opinion that the railway is the best means of opening up a country. One must not be guided exclusively by considerations of finance : the general economic aspect must also be considered. In Mr. Jourdain's opinion, there is practically no difference between the 1.067-m. and the 1-m. gauge from the point of view of stability. Mr. Jourdain contemplates the unification of gauge, for lines of 1-m. and 1.607-m. gauge, in two stages.

Mr. Lisboa de Lima *(Portuguese Colonial State Railways)* gave very detailed data in regard to the gauges existing in the Portuguese Colonies.

Mr. Van Noorbeeck *(Belgian National Light Railway Company)* proposed a draft conclusion.

Mr. Mellini was in favour of unification of gauge in each country.

The President requested Mr. Van Noorbeeck to present his conclusions in writing, and passed to consideration of the second part of the question.

Feeder railways in all countries.

Mr. Jourdain summarised his report, and submitted his conclusions to the meeting for discussion.

Mr. de Souza considered that public authorities should assist in the construction of light railways just as they do in the construction of roads. A system might be devised under which motor services would serve as feeders to the light railways.

Mr. Biraghi *(Confederazione Nazionale fascista dei Trasporti terrestri et della Navigazione interna, Italy)* was of the opinion that the question should be considered as much from the point of view of the present as of the future. In considering the closing down of existing lines, the financial and economic consequences of such a step must not be lost sight of. Mr. Biraghi was in favour of financial participation by public authorities. For the modernisation of light railways, recourse must be had to this form of collaboration. He remarked further that the third conclusion was equivalent to a decision to strangle motor transport competition.

M. Jourdain, replying to Mr. Biraghi, agreed to the addition to the first conclusion of the following : « unless public authorities participate with a view to the conservation of a national equipment. »

The only method of suppressing competition by motor services is to entrust the running of those services to the railway companies.

Mr. JACOBS, subject to the reservations previously indicated, was in agreement with the conclusions formulated by Mr. Jourdain. In Holland the public authorities assist the improvement of light railways by granting a monopoly to the companies concerned.

Mr. BIRAGHI declared himself satisfied with the remarks of the preceding speakers.

The PRESIDENT reported that in Italy the Government assists the modernisation of light railways by paying annuities of 20 000 to 30 000 lire per kilometre. These annuities amount to 40 000 lire in the case of electrification.

Mr. MARGUERAT *(Viège to Zermatt Railway, Switzerland)* was in agreement in principle with the summary proposed, but considered that motor transport should be subjected to a scheme of taxation and control similar to that at present in existence for railways. He is satisfied that the railways can regain what has been lost, in so far as tourist traffic is concerned.

Mr. MELLINI pointed out that the question of motor transport competition is to be considered by other Sections.

The PRESIDENT put to the vote the summary formulated by Mr. VAN NOORBEECK for the first part of Question XVII. This summary, the text of which is given below (part *a*) was adopted.

Meeting on the 8 May.

The meeting opened under the chairmanship of Mr. JACOBS, *Vice-president.*

Mr. VAN LEEUW *(Belgian Government)*, reverting to the question of penetration railways, referred to the railways of the Belgian Congo, and proposed that the conclusions adopted should be extended so as to recommend unification of gauge, not merely within a country, but also within economic regions.

The summary relative to penetration railways having been adopted at the meeting of the 6th May, it was agreed that Mr. Van Leeuw's proposition could not now be taken into consideration.

The meeting then adopted the summary relative to the second part (*b*) of Question XVII : *Feeder railways in all countries.*

The final summary of Question XVII runs as follows :

SUMMARY.

Part *a*) :

« It would appear from the remarks « made during the discussion that it is « desirable that there should be a uni- « form gauge for the penetration rail- « ways in each country. »

Part *b*) :

« With a view to remedying the pre- « sent situation of feeder railways, it is « recommended :

« 1. that, while respecting the rights of « capital invested, lines whose receipts « are so inadequate that considerable de- « ficits must result in the future, be clos- « ed down unless the State, Provinces or « Towns concerned will themselves cover « such deficits with a view to conserving « the national equipment;

« 2. that lines closed down be replaced « by motor services;

« 3. that the working conditions of the « remaining lines be improved with the

« financial assistance of the State, Pro-
« vinces, or Municipalities concerned;

« 4. as regards the attitude to be adopt-
« ed towards road transport competition,
« the Section refers to the conclusions
« adopted in conjunction with Sections
« III and IV. »

The above summary was adopted unanimously.

The above summary was adopted unanimously.

QUESTION XVIII.

Improvements in the permanent way equipment of light railways.

Preliminary documents.

1st report (Europe), by Mr. Van Noorbeeck. (See *Bulletin*, October 1929, p. 2149 or separate issue No. 32.)

2nd report (other countries), by Mostafa Hamdy El Kattan Bey. (See *Bulletin*, September 1929, p. 1941 or separate issue No. 27.)

Special Reporter : Mostafa Hamdy El Kattan Bey. (See *Bulletin*, May 1930, p. 1540.)

Report of Section V.

(See *Daily Journal of the Session*, No. 4, p. 6 and No. 6, p. 2.)

The meeting passed to Question XVIII.

Mostafa Hamdy El Kattan Bey, *Special Reporter*, read the summary of his report.

Mr. Marguerat (*Viège to Zermatt Railway, Switzerland*) was in agreement with the observations contained in the special report, but proposed the addition of a recommendation in favour of the standardisation of rails and sleepers.

He reported the use in Switzerland of hand-worked or automatic appliances for visual or audible signalling at level crossings.

He then reported the practically general use in that country of metal sleepers on light railways.

He drew attention to the advantages, from the point of view of economy in permanent way maintenance, of chemical weeding, using diluted chlorate of soda.

Electric welding is widely used for the construction and repair of track appliances.

Mr. Van Noorbeeck (*Reporter*) remarked that the question of signalling will be dealt with at the next session.

An exchange of views took place between Messrs. El Kattan, Van Leeuw (*Belgian Government*) and Marguerat with reference to the respective advantages of metal and wood sleepers.

The meeting unanimously adopted the summary contained in the special report and expressed the opinion that account should be taken of the efforts made by Standardisation Commissions with a view to the unification of rails and sleepers.

This summary runs as follows :

SUMMARY.

« Axle loads of the stock are increasing
« more and more, necessitating well
« made, dry, and well drained earth-
« works, and a much stronger and more
« solid permanent way.

« Any gauge of track can be suitable
« according to local circumstances.

« Equally, the choice of traction is a
« matter of convenience.

« The Vignole rail which is almost ex-
« clusively used in the lines laid beside
« high roads or on special earthworks,

« has the following average characteris-
« tics :

« Gauge of track 1.435 m. (4 ft. 8 1/2
« inches) : height 140 mm. (5 1/2 in-
« ches); width 130 mm. (5 1/8 inches);
« head 60 mm. (2 3/8 inches), of an aver-
« age linear weight of 38 kgr. (76.6 lb.
« per yard). Metre gauge : height 113
« mm. (4 7/16 inches); width 90 mm.
« (3 1/2 inches); head 45 mm. (1 3/4
« inches), of an average linear weight
« of 23 kgr. (46.4 lb. per yard) for the
« lines worked by steam, and of 125-mm.
« (5 inches) height, 105-mm. (4 1/8 in-
« ches) width, 57-mm. (2 1/4 inches)
« head, of an average linear weight of
« 32 kgr. (64.5 lb. per yard) for those
« worked electrically.

« The length of the rails varies general-
« ly between 9 and 18 m. (29 ft. 6 3/8 in.
« and 59 ft. 5/8 in.) with a tendency
« towards the latter figure.

« There is a marked preference for
« leaving the top of the sleepers free
« from ballast in view of the easier ins-
« pection and maintenance of the rail
« fastenings.

« The choice of the kind of ballast is
« chiefly guided by economic reasons,
« although it is recognized that broken
« stone constitutes the best ballast.

« Corrugated wear of rails only shows
« itself to a small extent on light rail-
« ways. The remedy for this trouble
« can be found in the use of a good and
« homogeneous steel with a high tensile
« strength, a high elastic limit and the
« highest possible elongation. These
« different characteristics must be in
« suitable proportions to each other.

« The laying of the track is done with
« opposite joints on the straight, stagger-
« ed joints being used only when laying
« in curves of a radius generally smal-
« ler than 100 m. (5 chains).

« Creep is hardly apparent in light rail-
« ways. It is overcome either by the fix-
« ing of angle fishplates to the sleepers,
« or by stirrups which are fixed to the
« rails and the sleepers, or simply by
« stirrups against the heads of the coach-
« screws.

« Frequently, the rails are laid at an
« inclination on the sleepers. This cant
« is obtained either by adzing the slee-
« pers or by the shape of the sole plate
« or the chair. The first mentioned
« system is, however, the more generally
« used.

« The fish plates of the rails are be-
« coming simpler and generalized by the
« angle fishplate with four or six bolts;
« the loosening of these is chiefly pre-
« vented by spring washers, Grover type,
« or by tension plates.

« Grooved or twin rails are used on the
« inner line of curves of a small radius.
« In this case the use in the outer line,
« of rails made of high tensile steel or
« special steels (manganese and chrome-
« nickel) is recommended.

« Barberot keys can be used with eco-
« nomy on the outer rails of small
« curves.

« The use of sleepers is general. Sleep-
« ers of oak, or pine impregnated with
« creosote, are the most used.

« The rails are fastened to the wooden
« sleepers by means of coachscrews ei-
« ther direct or in conjunction with steel
« sole plates, without marked preference
« for either system.

« When metal sleepers or ferro-con-
« crete sleepers are used, the fastening
« of the rail is usually by means of clips
« and bolts.

« The metal sleeper has advantages as
« regards duration and the security of
« the fastenings; it is not however ex-
« tensively used.

« Concrete sleepers are being increas-
« ingly used although they are costly
« and rather difficult to handle. The
« type consisting of two supports with
« large bearing surface joined by a small
« metal tie bar or by a ferro-concrete bar
« is generally preferred. It gives very
« encouraging results.

« The welding of rails is not yet gene-
« ral practice.

« Experiments made on a large-scale
« and of long duration show, however,
« the considerable advantages which can
« be obtained therefrom and encourage
« the development of its use.

« Thermit welding has up to now only
« been employed for new lines, arc weld-
« ing for old rails, repairs to points and
« crossings and building up of rail ends.

« The process generally adopted when
« electrically welding rails consists in
« welding the fishplates to the rails, to
« stiffen up the joint by a plate welded
« under the foot and to weld the heads
« of the rails together.

« Electric welding of the rails end to
« end without fishplates is, however, de-
« veloping and is would be interesting to
« see it continued in view of the encou-
« raging results obtained during the ex-
« periments.

« The limit, as regards length, of the
« parts of the line to be welded on spe-
« cial site or beside high roads is a mat-
« ter of the temperature fluctuations in
« the district. For a temperature fluc-
« tuation of 60° C. (108° F.) the welded
« length can go up to 60 m. (197 feet)
« without inconvenience.

« The use of heat treated cast steel in
« the manufacture of crossings is deve-
« loping and gives very satisfactory re-
« sults.

« The experiments with special manga-
« nese or chrome-nickel steel for the
« manufacture of parts subjected to much
« strain (crossings and cross-overs) have
« given entire satisfaction from the eco-
« nomic point of view as well as from
« that of wear. »

— The General Meeting held on the 10 May adopted this final summary.

QUESTION XIX.

Electrification of secondary lines.

Preliminary documents.

1st report (Europe), by Mr. L. Sekutowicz. (See *Bulletin*, February 1930, p. 491 or separate issue No. 60.)

2nd report (other countries), by Messrs. D. E. Ribera and J. M. Garcia-Lomas. (See *Bulletin*, February 1930, p. 665 or separate issue No. 64.)

Special Reporter : Mr. L. Sekutowicz. (See *Bulletin*, May 1930, p. 1544.)

Report of Section V.

(See *Daily Journal of the session*, No. 5, p. 6 and No. 6, p. 2.)

The meeting opened under the chairmanship of Mr. Jacobs, *Vice-president*.

Mr. Jourdain *(Chemins de fer du Nord-Est, France)*, replacing Mr. Sekutowicz, who was unable to be present, read the summary of the special report relative to Question XIX.

Mr. Lo Balbo (*Piedmont Steam Tramways, Italy)* enumerated the advantages which, under certain conditions, may be obtained by the use of accumulator motor vehicles.

He referred to the experience acquired, in particular in Italy and Germany, with this form of traction.

Mr. JOURDAIN mentioned the interest taken by French engineers in this question. He reported that, from the point of view of subsidies, the French Government regards the use of accumulator motor vehicles as equivalent to electrification. The extension of the system is impeded by reason of the unfavourable conditions offered by accumulator makers for the maintenance of the batteries.

Mr. LO BALBO having expressed the hope that the question of the electrification of lines would appear on the agenda of the next session, Mr. JOURDAIN considered it would be more useful to limit the question to accumulator traction.

Mr. MARGUERAT *(Viège to Zermatt Railway, Switzerland)* proposed that, if necessary, the question of accumulator traction should be combined with that of rail motor vehicles.

Mr. DE SOUZA *(Portuguese Government)* considered that, under certain conditions, the use of rail motor vehicles may afford an economic solution.

Mr. JOURDAIN was of the same opinion.

After this general discussion, the meeting considered in detail the summary proposed by the Special reporter.

Arising out of the first clause, a discussion took place as to the respective advantages of high tension continuous current traction and single phase current traction.

Messrs. JOURDAIN, BOUTON *(Union des Voies ferrées et des Transports automobiles, France)*, BEGHIN *(Departmental Railways, France)* and MARGUERAT took part in this discussion.

On the proposal of the PRESIDENT, the first clause was adopted without amendment.

The second clause was also adopted without amendment.

The third was slightly modified, as shown below.

The fourth was adopted without amendment.

The fifth was deleted and the sixth was considerably modified.

The following is the summary as finally adopted :

SUMMARY.

« 1. From the technical point of view, « the railway operators have merely to « make their selection, single phase current and high tension continuous current with overhead equipment having « demonstrated their suitability whilst « the principal firms supply perfectly satisfactory equipment.

« 2. Electrification of the main lines, « and that of large areas by utilising natural motive forces and the recent improvements in mercury vapour rectifiers have facilitated the use of electric « traction, particularly in the case of high « tension continuous current, which has « been made possible by the use of motors with commutating poles.

« 3. From the economic standpoint, « however, electrification is generally « only justifiable in the case of lines « which possess features favourable to « the system (cheap current, dear coal, « sufficiently heavy passenger traffic, « difficult conditions, necessity of meeting competition), and, above all, in the « case of new lines.

« 4. Nevertheless, especially in new « countries, the general interest may lead « to the adoption of solutions which are « not fully justified from the point of « view of the return on the invested capital, but necessary for the develop-

« ment of the country. In such cases it « may be in the interests of the commu- « nity to cover the expenses of electrifi- « cation out of the national or provin- « cial budgets, so that the burden of « those expenses will then in part fall « upon the tax-payers, and not on the « users alone. This moreover, is the « case with roads, canals, etc.

« 5. When it is desired to avoid the « installation of contact lines, the pro- « blem may be solved either by the elec- « trification of rolling stock only, or by « the use of rail motor vehicles. »

— The General Meeting held on the 10 May adopted this summary.

QUESTION XX.

Rail motor vehicles.

Preliminary documents.

1st report (France), by Mr. Paul BEGHIN. (See *Bulletin*, October 1929, p. 2203 or separate issue No. 33.)

2nd report (all countries, except Europe), by Messrs. C. E. BROOKS and R. G. GAGE. (See *Bulletin*, October 1929, p. 2229 or separate issue No. 34.)

3rd report Europe, except France), by Mr. Z. ZAVADJIL (See Bulletin, February 1930, p. 443 or separate issue No. 59.)

Special Reporter : Mr. P. BEGHIN. (See *Bulletin*, May 1930, p. 1552.)

Report of Sections III and V combined.

(See *Daily Journal of the session*, No. 7, p. 4 and No. 9, p. 4).

Sections III and V met to consider jointly *Question XX : Rail Motor Vehicles*, and the first part of *Question XII : Economical traction methods for use in particular cases : A. Organisation of train services on the minor lines of the large systems carrying little traffic and of little used trains on the more important lines of these systems.*

The meeting opened under the chairmanship of Mr. JACOBS, *Vice-President* of Section V, who later relinquished the Chair to Mr. CRISPO, *President* of that Section.

Mr. BEGHIN, *Special Reporter*, read his report on Question XX and added an observation relative to accumulator motor vehicles and those driven by internal combustion engines using producer gas.

He proposed the addition to the summary of two supplementary clauses which are not contained in his report.

Mr. GAEREMYNCK *(Special reporter on Question XII)* read the summary to the first part of his report.

Mr. LO BALBO (*Piedmont Steam Tramways, Italy*) emphasized the advantage that may be derived from traction by accumulator motor vehicles.

Mr. REDER (*Section secretary*) drew attention to the points which should receive particular attention when it is desired to use rail motor vehicles.

Prior to a vote being taken upon the summaries, Mr. BEGHIN remarked that there is no contradiction between his summary and that of Mr. GAEREMYNCK. The divergencies which may exist result from the fact that the applications to be contemplated are somewhat varying.

A discussion ensued upon the wording to be finally adopted. Messrs. LAMALLE (*Belgian National Railway Company*), LO BALBO, CZAPSKI (*Polish Government*), MICLESCO (*Rumanian State*), LEIBBRAND (*Deutsche Reichsbahn Gesellschat, Reporter on Question XII*), JACOBS and MOU-

TIER (*French Nord Railway*) took part in this discussion.

The following summary was adopted for Question XX :

SUMMARY.

« From the three reports presented it « appears that :

« 1. In France, up to the present, it « has been the general practice to ma- « nufacture light rail motor vehicles « fitted with petrol engines, the Diesel « engine having so far been little used « owing to its high weight and cost.

« 2. In the other countries of Europe « two types of internal combustion mo- « tor vehicles are in use :

« A light type with a power of less « than 100 H. P. usually fitted with a « petrol engine and with mechanical « transmission;

« A heavy type of 180 to 250 H. P. with « Diesel engine and with electric trans- « mission.

« In Europe use is also made of accu- « mulator motor vehicles and internal « combustion vehicles using producer « gas.

« 3. Throughout the rest of the world « all these types are found, with a « strongly marked tendency in the Uni- « ted States and Canada to very high « power, using Diesel engines with elec- « tric transmission.

« The reports unanimously agree in « stating that when the power exceeds « 150 H. P., electric transmission is « essential, and all find an appreciable « saving in the use of rail motor coaches.

« To summarize, it may be stated that:

« Wherever traffic permits of the « substitution of a motor vehicle for « a steam train, experience shows that « the substitution is financially an ad- « vantage, and this advantage will be- « come more appreciable when the tests « at present in progress with new fuels « (heavy oil, charcoal, etc.), and even « with other sources of energy, such as « electric accumulators, have confirmed « the results achieved to date.

« Further, the Congress expresses the « hope that manufacturers will produce « standardized types, thereby reducing « the first cost, which up to the present « has been so high as to prevent the « general adoption of those rail motor « vehicles the use of which is really eco- « nomical. »

— The General Meeting held on the 14 May ratified this summary.

SUMMARY REPORT OF THE DISCUSSIONS AT THE GENERAL MEETINGS

(10, 14 and 15 May 1930).

President : Mr José Gaytan de Ayala.

General secretaries : Messrs. P. Ghilain and A. Krahe.

Assistant general secretaries : Sir Henry Fowler, Messrs. Wolf and J. M. Garcia-Lomas.

Meeting on 10 May 1930.

The meeting opened at 9.30 a. m. under the presidency of Mr. Gaytan de Ayala, President of the eleventh session.

Sir Henry Fowler asked that the term « conclusion » which had been used should be replaced by « résumé » (summary). After an exchange of views between Sir Henry Fowler, Mr. Ghilain and Mr. Wolf it was decided that the word « summary » should be adopted for the English text and « Schlussfolgerungen » for the German text, the French text to remain unaltered.

The meeting proceeded with the examination of the summaries submitted by the various sections.

SECTION I.

Question I. — Adopted.

Question II. — The final summaries were altered as follows :

« V. — The following precautions are recommended when laying rails :

a) To utilise rails obtained from the head of ingots in those parts of the line which are least heavily stressed.

« VI. — The length of medium rails (of medium weight) can without inconvenience be increased to 24 m. (78 ft. 9 in.), and research and tests should be continued with a view to increasing the length beyond 24 metres (if necessary by means of aluminothermic welding) particularly at special points of the line where the effects of expansion are less to be feared.

« VIII. — With a view to reducing lateral wear on curves appliances for lubricating the lateral faces of the head of the rail and of the wheel tyre which come into contact during running on curves, should be perfected and developed, or special or heat treated steel rails should be used. »

Question III. — Adopted.

SECTION II.

Question V. — Adopted.

Question VI. — Adopted. This summary will be completed at the next meeting with other articles which will not modify those already adopted.

SECTION III.

Question IX. — Adopted, subject to the addition of the words « ought to » after « penalties for delay » in article 16.

Question X. — Adopted.

Question XI. — Adopted.

SECTION IV.

Question XIII. — The amended summary was adopted after slight modifications agreed to after a discussion between Messrs. Colson (*Vice-president of the Permanent Commission*), Wasiutyński (*Special Reporter*) and Sir Josiah Stamp (*London Midland and Scottish Railway*).

Mr. Colson considered that in article 13 the words « The Railway Congress emphasizes the fact that » should be deleted in view of the relatively small importance of that article.

Mr. Wasiutyński pressed that the words should be retained and suggested the transposition of articles 12 and 13.

As Mr. Colson did not press his point, article 13 was adopted without alteration and the transposition of articles 12 and 13 was agreed upon.

Sir Josiah Stamp considered that article 3 should be extended to indicate that railway companies should not obtain concessions except in so far as they were in a position to make use of them.

After an exchange of views between Messrs. Wasiutynski, Colson and Sir Josiah Stamp, the meeting decided that the following words should be added at the end of article 3 : « where they are prepared to take advantage of it ».

Subject to these alterations to articles 3, 12 and 13, the summary was adopted.

Question XIV. — Mr. Bruneau (*Reporter*) considered that in regard to article 7 the wording was too affirmative in regard to the use of statistical machines. He suggested that the phrase : « Their advantage lies in the possibility of carrying out investigations... » be modified by adding the word « certain » before the word « investigations » in line 8.

This was agreed to and the summary was adopted.

Question XV. — Mr. Marin del Campo (*Special Reporter*), asked what were the English and German translations of the words « traitement du personnel ». He considered that it should be made quite clear that the words were intended to cover not merely the remuneration of the staff, but also the way in which the staff should be treated in a general way.

On examination of the text it was found that the German word was sufficiently explicit.

In regard to the English version it was agreed, on a proposition made by Sir Josiah Stamp, that the word « treatment » should be substituted for the words « staff remuneration ». Subject to this alteration, the summary was adopted.

SECTION V.

Question XVII. — Adopted.

Question XVIII. — Adopted.

Question XIX. — Adopted.

Before the meeting dispersed the PRESIDENT announced that it was the birthday of H. R. H. The Prince of the Asturias. It was agreed that the officials of the Congress should call at the Royal Palace and inscribe their names there, as a mark of their congratulation and esteem for the Royal Family.

— The meeting terminated at 11.15 a. m.

Meeting on 14 May 1930.

The meeting was opened at 3.30 p. m., under the presidency of Mr. GAYTAN DE AYALA. The meeting examined the summaries arrived at in the various Sections :

SECTION I.

Question IV. — Adopted.

SECTION II.

Supplement to the Summaries of Question VI. — Adopted.

SECTION III.

Question XII. — Mr. LEIBBRAND (*Reporter*) was in in agreement with regard to the text of the summaries on condition that « or with accumulators » should be added to paragraph 2 (part A), after the brackets (internal combustion or Diesel). After an exchange of views, between Messrs. LE BESNERAIS (*French Nord Railway*), ALLARD (*Belgian National Light Railway Company*), GHILAIN (*General Secretary*), and GAEREMYNCK (*Special Reporter*), the amendment was adopted. Article 2 was modified as follows :

« Many of the railways also used rail motor coaches with or without trailers, with a steam or internal combustion engine (explosion or Diesel) or with accumulators, the power usually reaching 100 to 150 H. P. or more, and in addition Diesel locomotives.

« There is a marked tendency to extend the use of such vehicles. Their substitution for heavy trains allows of higher speed and supplementary stops between stations without prolonging the total duration of journey. Their introduction, however, is of too recent date for definite conclusions to be formed concerning the economies resulting from their use. »

SECTION IV.

Question XVI. — Adopted.

SECTION V.

Question XX. — Adopted.

THE PRESIDENT reminded the members that to-morrow, 15th May, there would be two plenary meetings, the first at 9.30 a. m. and the other at 12.30 p. m., this latter to be presided over by His Royal Highness the Prince of the Asturias.

Meeting on 15 May 1930.

The Meeting opened at 9.45 a. m., Mr. José Gaytan de Ayala being in the Chair.

1. The Congress first of all discussed the summaries of Questions VII and VIII.

Question VII. — This was adopted, except for a correction in the fourth line : « The Congress particularly recommends to the Railway Companies the carrying out of methodical trials, with a view to determining whether, at high speeds, electrical locomotives with motors suspended by the nose have a more injurious effect on the track than other types. »

Question VIII. — Approved, except for a modification to article 7, which was asked for by Mr. Van Schouwenburg (*Dutch East Indies Railway Company*) : « heat insulation » instead of « insulation ».

The Congress then passed on to other points in the agenda for the day.

2. *The admission of Bulgaria, Turkey and Columbia.* These Countries were elected unanimously.

3. Resolution concerning the *admission of Austria and Hungary.* The Congress decided to extend to Austria and Hungary the resolution passed in London in 1925 in favour of Germany. It was agreed to increase by two, the number of mandates of the permanent Commission, one being represented by Austria and the other by Hungary.

4. *Increase in the number of members of the Permanent Commission.*

Nine mandates had hitherto been conferred since the last session. The mandates for Holland, Portugal, Yugoslavia, Brazil, the Argentine Republic, Australia, New Zealand, South Africa and affiliated Organisations were confirmed.

5. *The mandates to the Permanent Commission, conferred since 1925, were confirmed.*

6. *Re-election of members of the Permanent Commission whose mandates have just expired.*

The mandates were confirmed, with the exception of the following :

Mr. Gresley instead of Sir Guy Granet;

Mr. Yumoto instead of Mr. Hirayama;

Mr. Palmer instead of Sir Ernest A. Seymour Bell.

A member instead of Mr. Djouritchitch will be nominated later.

7. *Allocation of additional mandates to Spain.*

Two additional mandates were allocated to Spain; Messrs. Boix and Moralès were unanimously elected, by acclamation.

Mr. Gaytan de Ayala was nominated life member, by acclamation.

Mr. Gaytan de Ayala returned thanks on behalf of himself and his colleagues.

8. *Intervals between Sessions.*

The meeting unanimously approved an interval of three years between Sessions.

9. *Choice of venue for the next Session.*

Mr. Ghilain, *general secretary*, set out the position, and stated that, following

negociations, the Permanent Commission wished to propose Egypt.

Mr. MATSUNAWA (*Japanese Government*) suggested that the Congress should take place in Tokio in 1936.

Mr. COLEMAN (*Canadian Pacific Railway*) asked that the question be held over, as Canada desired to receive the Congress in 1936.

THE PRESIDENT thanked the Japanese and Canadian Delegates, and stated that this Congress was not in a position to fix the venue of the 1936 Congress. A definite decision would only be made in 1933, but note was taken of the suggestions made by Messrs. MATSUNAWA and COLEMAN, to whom thanks were accorded. *(Applause.)*

Mr. EL KATTAN (*Egyptian Government*) assured the Assembly that Egypt would be delighted to extend a most cordial welcome to the Delegates to the Congress in 1933.

10. *Auditing of accounts. Nomination of auditors.*

Mr. HABRAN, *secretary-treasurer*, read the report of the auditors who had undertaken the auditing of the accounts from 1922 to 1925.

He handed in the provisional statement of receipts and expenditure for the period from 1925 to 31st March, 1930.

The meeting appointed for the auditing of this latter account, Mr. BARRIOL, chief accountant of the Paris-Lyons-Mediterranean Railway, and Sir Henry FOWLER, chief mechanical engineer, London, Midland & Scottish Railway.

The meeting terminated at 11.0 o'clock.

CLOSURE OF THE SESSION

(15 May 1930).

The Senate Hall was crowded with delegates, when at 12.30 p. m., H. R. H. the Prince of the Asturias entered and was greeted with loud and continued applause. His Royal Highness took the chair, having on his right Mr. Matos, Minister of the Fomento and Mr. Foulon, president of the Permanent Commission, and on his left Mr. Gaytán de Ayala, president of the Session, and Mr. Boix, vice-president. On opening the meeting His Royal Highness called upon Mr. Gaytán de Ayala, who delivered the following speech :

« Your Highness,
« Mr. President,
« Gentlemen,

« The work of the XIth Congress has now reached completion.

« The opening meeting was presided over by H. M. the King in person.

« The closing meeting is under the presidency of H. R. H. the Prince of the Asturias, the heir to the throne of Spain, a prince whose culture and ability give great promise and whose youth and great charm inspire the warmest affection. I feel I am the faithful interpreter of your feelings when I express to Him our thanks for the honour He has paid us.

« I have had the undeserved honour of presiding over the XIth Congress which in no way has fallen short of its predecessors, either in the importance, up-to-dateness and value of the questions dealt with, nor in the number and distinction of the eminent railwaymen who have come to Madrid from all parts of the world.

« The discussions in the five sections were based on facts established on the complete knowledge of the subjects by highly qualified representatives of railway administrations throughout the world and have resulted generally in summaries of the greatest scientific and practical value, which mark a further stage in the upward progress of the science of transportation.

« I wish to note in particular the cordial atmosphere in which the discussions have taken place. It is certain, as I both hope and desire, that the ties of affection and mutual appreciation formed during these few days will never lapse, and that the spirit of co-operation, in itself so useful, and which in fact is the only way by which so complex and universal a subject can be perfected, will be maintained throughout the world.

« Your kindness and your consideration removed the difficulties which I feared would be met with, and for this, I thank you all.

« I tender my thanks to the four vice-presidents, and to the five general secretaries who, with me, formed the headquarters office; I also have to thank the representatives in Madrid of the Permanent Commission, which manages the Association and is the heart of this Congress. This Commission is presided over by Mr. Foulon whose ready wit and great experience have inspired the deli-

berations, and whose activity and extreme courtesy have captivated the hearts of all those who have come into contact with him. I also tender my thanks to the general secretary, Mr. Ghilain, a man of great experience in matters of this sort, and who has largely contributed to the success of the Session; also to the presidents, the vice-presidents and secretaries of the five Sections, the latter who directed and led the discussions with assiduity, intelligence and great ability; to those members of the Congress who have so brillantly contributed to the progress of railway working by a courteous exchange of ideas between men of the highest knowledge and lastly to the Railway Companies of Spain and the International Sleeping Car Company, who have also contributed much to the success of the session *(Applause.)*.

« I wish to express my gratitude especially to the technical staff, both national and foreign, who with tact and goodwill have worked up the many details of so complicated an organisation as the XIth Congress, further complicated by having to furnish daily to the delegates a resumé of the discussions in four languages, as well as other information of interest to them. And lastly I again wish to express my gratitude to the general secretaries of the Local Organising Committee, and to the Executive Committee of the Secretariat.

« Finally, I think Messrs. Augusto Krahe and José Garcia-Lomas merit special mention. I personally had occasion to witness for two years their splendid and far-seeing initiative, their talent for organisation, their firmness, tact and modesty.

« I am not alone to pay this tribute to them, for most of those present here have appreciated their talent and all will, I am sure, realise the part they have played in this Congress. By their ability they have gained not only success but also renown. I ask you to applaud these two young engineers, who have a brilliant future before them. *(Applause.)*

« In conclusion, I wish to express my gratitude to all in the following words which, at the closing Session of the London Congress, Sir Evelyn Cecil used :

« I trust that during the years which
« will intervene before we meet again
« at Madrid, the world of railways will
« continue to show marked improve-
« ments in all the scientific character of
« its work of improving for the benefit
« of the public the means of communi-
« cation and transport throughout the
« world, and to work together in com-
« mon co-operation for the better under-
« standing of nations and mutual good-
« will. »

« What was then foreseen has now happened. The anticipation of Sir Evelyn Cecil, that well-known figure in the railway field, whose tireless activity, talent and kindness have been fully manifested here, have been confirmed in the present Congress, during which attention has been directed to the rapid progress made, involving the reduction from five to three years of the interval between the Congresses, and necessitating the examination of the various questions in the light of the rapid advance of science.

« The ambition of all of us is to find solutions to all problems of improvement, however small, which arise daily, and involve all institutions, such as ours, which endeavour to bring together world-wide information in regard to transport questions.

« Although the time has come to separate, we shall remain united in spirit by sentiments of affection. We shall remember you for all time and when you

return to your respective countries, remember that Spain received you with friendship and that you can always rely on her co-operation in the works of peace and progress which are our objective.

« I wish to tender my humble duty to the heads of all the Nations represented at this Congress and, in addition, to pay my most dutiful homage to His Majesty King Alfonso XIII. *(Long applause.)*

His Royal Highness then called upon Mr. Foulon who spoke as under :

« Your Highness,
« Excellency,
« Ladies and Gentlemen,

« My first thought is one of deep and respectful gratitude towards H. M. the King and the Royal Family for the interest They have deigned to show in the work of this Congress.

« I respectfully greet His Royal Highness the Prince of the Asturias, who has been good enough to honour this formal closing meeting by his presence.

« At the same time I have the very agreeable duty to repeat to the Spanish Government and particularly to the Minister of the Fomento as well as to the Management of the great Railway Companies and to the International Sleeping Car Company, our sincere thanks for their careful organisation in connection with our XIth Congress, and for the courteous reception of the delegates and their families, of which we shall always retain a grateful memory.

« Our eminent President, Mr. José Gaytán de Ayala has called attention to the energy, activity and initiative of Messrs. Krahe and Garcia-Lomas, who have for two years taken a large share in the organisation of the Congress. I am anxious to associate myself with this well deserved testimony; nor must I forget the thanks due to our honoured and distinguished President, Mr. José Gaytán de Ayala whose tact, courtesy and efficiency we have all admired, and also to his indefatigable and devoted fellow workers.

« We are now about to return to our respective countries, and we shall retain an agreeable recollection of you all and of your assistance through which useful work for railways in general has been completed. At the same time we thank you for having enabled us to spend some pleasant days in your charming country.

« As you have so rightly said, my dear President, we have been received as friends.

« From the bottom of our hearts we thank you.

« Our President, Mr. José Gaytán de Ayala, at the close of his speech sent his respectful greetings to the Heads of all the Nations represented at the Congress. In your name I thank him cordially for this graceful compliment.

« We are about to resume work in our respective countries, and prepare for the new Session to be held in Cairo.

« I trust the Cairo Congress will be as successful as this one, and I hope that we shall see there many of our Spanish colleagues for whom we have the greatest esteem and affection.

« I wish long life to the King and Royal Family and continued prosperity to Spain. » *(Prolonged applause.)*

His Royal Highness the Prince of the Asturias then closed the meeting. On rising he was greeted with loud and prolonged cheers.

List of Members of the Permanent Commission

OF THE

INTERNATIONAL RAILWAY CONGRESS ASSOCIATION

after the elections which took place at the General Meeting held on the 15 May 1930 (Art. 6 of the Rules and Regulations).

President :

E. Foulon (1), directeur général de la Société Nationale des chemins de fer belges; rue du Progrès, 74, Brussels.

Vice-presidents :

C. Colson (3), membre de l'Institut, inspecteur général des ponts et chaussées, vice-président honoraire du Conseil d'Etat de France, membre du Conseil supérieur des chemins de fer de France; rue de Laplanche, 2, Paris;

U. Lamalle (3), directeur de l'exploitation à la Société Nationale des chemins de fer belges; rue de Louvain, 17, Brussels.

Members of the Executive Committee :

N...

The Right Hon. Sir Evelyn **Cecil** (2), G. B. E., privy councillor, director, Southern Railway Great Britain); Cadogan Square, 2, London, S. W. 1;

P. E. Javary (2), directeur de l'exploitation de la Compagnie du chemin de fer du Nord français; rue de Dunkerque, 18, Paris.

Ex-presidents of sessions, members ex-officio :

The Right Hon. Viscount **Churchill,** G. C. V. O., chairman, Great Western Railway (Great Britain); Paddington Station, London, W. 2;

J. Gaytán de Ayala, ancien président du Conseil des travaux publics d'Espagne; Claudio Coello, 48-2°, Madrid.

Members :

R. H. Aishton (1), president, American Railway Association; South Dearborn Street,431, Chicago, Ill.;

T. A. Alstrup (1), directeur général des chemins de fer de l'Etat danois; Solvgade, 40, Copenhagen, K.;

W. W. Atterbury (2), president, Pennsylvania Railroad Company; Broad Street Station, Philadelphia, Pa.;

F. Besser (2), Ministerialrat, Reichsverkehrsministerium; Wilhelmstrasse, 80, Berlin, W. 8;

F. Boix (2), administrateur-directeur de la Compagnie des Chemins de fer du Nord de l'Espagne; Estacion del Norte, Madrid;

F. Castello (3), directeur général des chemins de fer au Ministère des travaux publics de la République Argentine; Buenos-Ayres;

J. Castiau (3), directeur général au Ministère des transports de Belgique (services de contrôle); rue de la Charité, 25, Brussels;

H. Caufriez (2), directeur général de la Société nationale belge des chemins de fer vicinaux; rue de la Science, 14, Brussels;

The Right Hon. Sir Evelyn **Cecil,** G. B. E. (already named);

The Right Hon. Viscount **Churchill,** G. C. V. O. (already named);

C. **Colson** (already named);

R. da Costa Couvreur (2), ingénieur en chef de la division de la voie et des travaux de la Direction générale des chemins de fer, membre du Conseil supérieur des chemins de fer du Portugal; Campo Grande, 75-A II°, Lisbon;

Dautry (1), directeur général des chemins de fer de l'Etat français; 20, rue de Rome, Paris;

Sir Francis **Dent** (1), C. V. O., director, Southern Railway (Great Britain); Dock House, Beaulieu (Hants), England;

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(1) Retires at the 12th session.
(2) Retires at the 13th session.
(3) Retires at the 14th session.

Dorpmüller (2), Generaldirektor der Deutschen Reichsbahn-Gesellschaft; Voss-Strasse, Berlin;

A. **Fabris** (2), ingénieur, chef du service du matériel et de la traction des chemins de fer de l'Etat italien; Villa Patrizi, Rome;

F. **Fiori** (2), ingénieur, administrateur des chemins de fer de l'Etat italien; Villa Patrizi, Rome;

M. **Fontaneilles** (3), inspecteur général des ponts et chaussées, président de la section des chemins de fer au Conseil général des ponts et chaussées de France, président du Conseil de réseau des chemins de fer d'Alsace et de Lorraine; rue de Sèvres, 4, Paris;

E. **Foulon** (already named);

Sir Henry **Fowler** (3), K. B. E., chief mechanical engineer, London Midland & Scottish Railway; Derby;

A. **Frank** (2), ingénieur des ponts et chaussées, directeur au Ministère des Communications de Pologne; Warsaw;

J. **Gaytán de Ayala** (already named).

P. **Ghilain** (3), ingénieur en chef au service du matériel de la Société Nationale des chemins de fer belges; rue du Progrès, 74, Brussels;

A. **Granholm** (3), directeur général des chemins de fer de l'Etat suédois; Stockholm;

H. N. **Gresley** (3), chief mechanical engineer, London & North Eastern Railway; King's Cross Station, London, N. 1;

Grimpret (3), conseiller d'Etat, directeur général des chemins de fer au Ministère des Travaux publics de France; 241, boulevard St-Germain, Paris;

R. J. **Harvey** (1), consulting engineer to the Government of New-Zealand; Victoria Street, 34, Westminster, London, S. W. 1;

Henry-Gréard (1), directeur de la Compagnie du chemin de fer de Paris à Orléans; rue Guynemer, 30, Paris;

H. **Hunziker** (2), ingénieur, directeur de la division des chemins de fer du Département fédéral des postes et des chemins de fer suisses; Berne;

Sir Cyril **Hurcomb** (2), K. B. E., C. B., secretary to the Ministry of Transport (Great-Britain); Whitehall Gardens, 6, London, S. W. 1;

A. **Jacques** (2), directeur de la Voie à la Société Nationale des chemins de fer belges; rue de Louvain, 17, Brussels;

P. E. **Javary** (already named);

E. **Kejr** (1), ingénieur, conseiller des constructions du département V/1 au Ministère des chemins de fer de Tchécoslovaquie; Prague;

U. **Lamalle** (already named);

L. F. **Loree** (1), president, Delaware & Hudson Railroad; Nassau Street, 32, New York City;

A. **Mange** (2), administrateur de la Compagnie du chemin de fer de Paris à Orléans, président du Comité de gérance de l'Union internationale des chemins de fer; rue de la Bienfaisance, 42, Paris;

C. **Marchi** (2), député au parlement italien, président général de la Confederazione nazionale fascista dei trasporti terrestri e della navigazione interna; via Francesco Crispi, 10, Rome;

M. **Margot** (1), directeur général de la Compagnie des chemins de fer de Paris à Lyon et à la Méditerranée; rue Saint-Lazare, 88, Paris;

Marguerat (2), directeur des Compagnies de chemins de fer de Viège à Zermatt, Furka-Oberalp, Gornergrat et Schöllenen; Lausanne;

E. **Maristany** (1), marquis d'Argentera, directeur général de la Compagnie des chemins de fer de Madrid à Saragosse et à Alicante; Estación de Atocha, Madrid;

C. **Mereutza** (3), sous-directeur général des chemins de fer roumains; Bucarest;

G. **Molle** (2), secrétaire technique à la Direction générale de la Société Nationale des chemins de fer belges; rue de Louvain, 17, Brussels;

L. **Moralès** (3), vice-président du Conseil supérieur des chemins de fer d'Espagne, président du Conseil d'administration des Chemins de fer de l'Ouest de l'Espagne, Estación de las Delicias, Madrid;

C. **Oddone** (1), directeur général des chemins de fer de l'Etat italien; Rome;

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(1) Retires at the 12th session.
(2) Retires at the 13th session.
(3) Retires at the 14th session.

F. **Palmer** (1), C. I. E., consulting engineer, Office of the High Commissioner for India; 55, Broadway, Westminster, London, S. W. 1.

J. R. **Paul** (1), directeur de la Compagnie des chemins de fer du Midi français; boulevard Haussmann, 54, Paris (IXe);

G. **Philippe** (1), inspecteur général des lignes Nord belges; Liége;

P. **Riboud** (3), directeur de la Compagnie des chemins de fer de l'Est français; rue d'Alsace, 21, Paris;

N. **Rulot** (1), directeur du matériel de la Société Nationale des chemins de fer belges; 17, rue de Louvain, Brussels;

A. **Schrafl** (3), président de la Direction générale des Chemins de fer fédéraux suisses; Berne;

Abdul-Hamid **Soliman** Pacha (3), directeur général des Chemins de fer de l'Etat égyptien; Cairo;

Sir Josiah **Stamp** (3), G. B. E., D. Sc., chairman and president of the Executive, London Midland & Scottish Railway; Euston Station, London N. W. 1;

J. J. **Stieltjes** (1), inspecteur général au Service de la surveillance des chemins de fer des Pays-Bas; The Hague;

Sir Henry W. **Thornton** (1), K. B. E., chairman and president, Canadian National Railways; Montreal, Que.;

Tsang Ou (3), directeur général adjoint du Chemin de fer du Lunghai (Chine); rue de Mogador, 5, Paris;

Antonio **Valenciano y Mazerès** (3), inspecteur général des ponts et chaussées, administrateur de la Compagnie des chemins de fer de Madrid à Saragosse et à Alicante; General Oráa, 5, 3°, Madrid;

H. **van Manen** (2), directeur des Chemins de fer néerlandais; Utrecht;

D. **Vickers** (1), director, London, Midland & Scottish Railway; Chapel House, Charles Street, Berkeley Square, London, W. 1;

J. S. de V. **von Willich** (1), B. Sc., A. M. I. C. E., advisory engineer at the Office of the High Commissioner for the Union of South Africa; South Africa House, Trafalgar Square, London, W. C. 2;

Sir Ralph Lewis **Wedgwood** (2), C. B., C. M. G., chief general manager, London & North Eastern Railway; King's Cross Station, London, N. 1;

D. **Willard** (2), chairman of the Board, American Railway Association; president, Baltimore & Ohio Railroad; Baltimore, Md.;

Wolf (1), Geheimrat, Direktor der Deutschen Reichsbahn-Gesellschaft und Mitglied des Direktionskomitees dieser Gesellschaft; Voss-Strasse, Berlin;

N. **Yumoto** (3), secretary of the japanese Ministry of Railways and manager of its Berlin Office; Friedrich-Ebert-Strasse, 6, Berlin, W. 9.

N ...(3) (Germany);
N ...(3) (Germany);
N ...(1) (Germany);
N ...(2) (Australia);
N ...(2) (Brazil);
N ...(3) (Jugoslavia).

Honorary member : Gustav **Behrens,** director, London Midland & Scottish Railway; Chepstow Street, 20, Manchester.

SECRETARY'S OFFICE : rue du Progrès, 74, Brussels.

General secretary : P. **Ghilain** (already named).

Secretary-treasurer : J. **Habran,** directeur d'administration honoraire des Chemins de fer de l'Etat belge.

Assistant secretaries : R. **Desprets,** ingénieur principal à la Société Nationale des Chemins de fer belges.

E. **Minsart,** ingénieur principal à la Société Nationale des Chemins de fer belges.

A. W. **Chantrell,** ingénieur principal à la Société Nationale des Chemins de fer belges.

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(1) Retires at the 12th session.
(2) Retires at the 13th session.
(3) Retires at the 14th session.

RECEPTIONS, VISITS TO WORKS AND EXCURSIONS.

5 May, 1930.

After the Inaugural Meeting of the eleventh Session, His Majesty The King of Spain graciously received, in the office of Mr. Gaytán de Ayala, delegates from the various countries represented at the Congress. His Majesty listened with much interest to the remarks of the delegates in regard to railway work in their respective countries and expressed pleasure at the progress that is being maintained throughout the world.

6 May.

The City Corporation of Madrid, recognizing the world-wide significance of the choice of the capital of Spain as the meeting place for this important Congress, and desiring to suitably acknowledge the honour so conferred, organized, in the old-world gardens and hunting grounds of the Royal Court in the Retiro Park, a fête the aim of which was two-fold : reception of the City of Madrid and welcome to all Congress delegates of the whole world.

The guests entered the Park by the Hernani Gate, where they were received by the Mayor, His Excellency the Marquis de Hoyos and by the President of the Congress, Mr. Gaytán de Ayala, seconded by members of the Local Organising Committee.

The municipal band gave an interesting concert, rendering a fine choice of pieces from a repertory which enjoyed a well-deserved success during the band's recent tour in various countries.

Refreshments were provided at a buffet which had been installed in one of the walks of the Park.

A large number of delegates were present and all were delighted at the hospitality shown them by the City of Madrid through the City Corporation.

The same evening a pelota match (Basque ball game) was held at the Jai-Alai Fronton for the enjoyment of those taking part in the Congress. The ladies were presented with bouquets of flowers brought specially from Valencia. Two games were played, one with the « cesta » (basket) and the other with the « pala » (bat), and songs and Aragonese dances were given during the interval.

7 May.

At 4.20 p. m. two special trains left the Southern station (M. Z. A.) carrying the delegates who had accepted the invitation of the Madrid, Saragossa and Alicante Company, to visit the Company's permanent way workshops and stores at Villaverde Bajo a village situated some 4 1/2 miles from Madrid.

From Villaverde station a good view is obtained of the workshops and stores, and the first object which attracted attention was a large concrete water tank, built in the shape of a goblet. It has a capacity of 3 780 cubic feet in the upper compartment and 6 000 cubic feet in the lower compartment. It is at present used as a reserve, as water is now laid on to all departments of the works.

The metal stores had been most artistically arranged by the M. Z. A. Company's own staff, and in it refreshments were taken, after which Sir Henry Fowler, Assistant General Secretary, expressed the thanks and appreciation of those present to the M. Z. A. Company,

represented there by Messrs. Arrillaga and Mendizabal.

The former, in replying, regretted that, owing to illness, Mr. Maristany, Marques or Argentera, had been deprived of the pleasure of welcoming the visitors and of expressing his thanks to them for the honour conferred upon the Company by their visit. He also thanked the Company's staff for the enthusiasm and zeal which they had displayed in their efforts to make the visit both interesting and enjoyable. Both speakers were loudly applauded.

As a souvenir each visitor was presented with a small bronze goblet, made in the Company's workshops and reproducing in miniature the water tank mentioned above. The ladies were also presented with bouquets.

On the same day another group of delegates visited the workshops and depots of the Madrid Tramway Company, where they were received and hospitably entertained by the Management.

8 May.

The Orphanage for railwaymen's children, situated at Dehesa de la Villa, part of the « University City », was opened at midday. H. M. The King, the Prime Minister, the Minister for Public Works and Labour, the Director General of the Ministry of Labour, the Marques of Urquijo, the Committee of Management of the College and other well known persons attended. The delegates to the International Railway Congress were all present to receive the King. In the hall of the Orphanage the President of the Orphanage, Mr. Tejada, thanked the King and the Congress delegates for attending, and reviewed the work done by the Association for its members.

The Prime Minister, in the name of the King and the Government, congratulated the Managers of the Orphanage on the results of their labours and promised the support of the Government in developing the work, so that children from the lower classes should be able to receive the instruction they needed for the well-being of the country.

The King wrote his name in an album, specially provided, and then visited the buildings and grounds, from which there is a very fine view.

Lunch was then served.

In the evening a concert of Spanish music and folk-songs was given at the Teatro Metropolitano for the delegates to the Congress, the King, the Queen, the Infante Don Jaime and the Infantas Da. Beatriz and Da. Cristina graciously honouring it with their presence.

The concert was conducted by Mr. Perez Casas and Mr. Benedito, and the music was interpreted by the Madrid Philharmonic Orchestra and Mass Choirs. The scene in the theatre was brillant in the extreme, and practically all the delegates and their families were present.

After the concert a fête was given in the theatre dance hall, which was artistically decorated with flowers and Manila shawls. A troupe of dancers performed typical Andalusian dances with songs, and two dancers interpreted various modern dances. A general dance followed, lasting well into the night, light refreshments being served.

9 May.

The Local Spanish Organising Commission gave a banquet to the Members of the Congress at 9 p. m. at the Palace Hotel.

At the conclusion of the banquet, Mr. Gaytán de Ayala made the following speech :

« Your Excellencies,

« Ladies and Gentlemen,

« It is a great pleasure for us to meet, at this banquet which the Local Organising Commission has the honour of offering to you, such a brilliant gathering of railway technical experts, composed of the most eminent in the whole

world, who, demonstrating their sympathy for Spain, have responded to our invitation in such large numbers. You came accompanied by distinguished lady members of your families. For thus enhancing the lustre of this Congress, we tender to you our best thanks.

« May their stay among us be a special pleasure to them.

« The illustrious Chairman of the Permanent Commission, Mr. Foulon, in his brilliant speech in the Senate, pointed out how rapidly our Association had progressed and extended. Forty-two Governments and two hundred and thirty Railway Administrations, operating 620 000 kilometres of line, had joined the Association. Such a rapid extension is an eloquent proof of the universal interest taken in the work of the Congress, of the expert way its organisation was understood, and of the resulting efficiency of its labours.

« The initiative of its creation was due to Belgium, that admirable country, so small geographically and so great through the virtues of its people, its industry and commerce and its moral and material progress, which place it among the nations which most contribute to universal culture.

« The Permanent Commission, the heart of the Association, has its headquarters in Brussels, and by its activity and perfect organisation and under the intelligent guidance of its enlightened members, presided over by the illustrious Mr. Foulon, it enhances the prosperity of our Association.

« We are chiefly indebted to the Permanent Commission for its initiative and for the attainment of incessant progress, as well as for the pleasant hours we periodically spend at our meetings in various capitals, which afford us an opportunity of establishing and strengthening bonds of fraternity and sympathy; I propose the toast of H. M. King Albert and the Royal Family. (*Long applause.*)

« You represent every nation in the world. You have honoured Spain by your visit in order to unite your efforts in a work of culture and peace. I invite you to raise your glasses in honour of the Reigning Families, of the Head of Nations, of the Governments of every Country so brilliantly represented here and to the prosperity and greatness of the Association. »

Mr. Foulon, Chairman of the International Association, then addressed the following words to the Members of the Congress :

« Your Excellencies,

« Ladies and Gentlemen,

« We have listened with deep feeling to the speech of the eminent President of the Session, Mr. José Gaytán de Ayala, who has expressed in the warmest terms the cordiality and esteem with which Spain has received us.

« In the name of all present I tender him my hearty thanks.

« Our Association accepted with the greatest pleasure the invitation of the Spanish Government to hold the XIth Congress in their beautiful capital.

« The brilliant success of the Barcelona and Sevilla Exhibitions, in which the majority of Governments have participated, has demonstrated the industrial and commercial vitality of Spain, and at the same time the sympathy shown to that Country throughout the world.

« To-day, the great number of delegates who, on the occasion of the XIth Congress, have visited Spain with their families, provides a further proof of the attraction exercised by that Country.

« The Spanish flag was one of the first to cross the seas and carry to remote regions the benefits of civilisation.

« Both in painting and architecture, Spain possesses artistic treasures of world-wide reputation.

« Under a radiant sky are united, in a harmonious whole, distinct groups

which have retained the pieturesqueness of their dress and customs, thereby adding further charm to a visit to this wonderful Country.

« We shall all retain indelible memories of our visit.

« Gentlemen, the Congress is « in full swing », and everything points to its complete success.

« Questions of prime importance are debated by learned experts, whose experiences will throw fresh light on the problems dealt with and form the foundations of further progress.

« Innovations in the transportation field are a daily occurrence and they have a preponderating influence on world relations and on the economic situation of countries.

« The prodigious development of motor transport and the increasing extension of air transport have drawn the attention of railway administrations, who are directing all their efforts towards combining their own activities with these new means of transport, with a view above all to the common welfare.

« With the object of following more closely the evolution in means of transport and in railway technique, the Permanent Commission will propose to the Congress to shorten the interval between the sessions and adopt a period of three years. In this way we shall be in more frequent and closer contact for that mutual interchange of information and impressions, which is so instructive and upon which we shall no doubt, have reason to congratulate ourselves.

« Your Excellencies,
« Ladies and Gentlemen,

« I wish to say once more how grateful all the delegates are for the part which H. M. the King has deigned to take in the Congress and for the great honour His Majesty has done us in presiding over our inaugural meeting. This august favour will remain one of the most gratifying features in the records of the Association.

« In this meeting, at which so much cordiality has been shown, I must express my warmest thanks to the Spanish Government and to the great Railway Companies for having received us with so much kindness and such marked signs of friendship.

« It is also a pleasure to repeat how grateful we are to the distinguished and devoted members of the Local Commission, who have organized in such an efficient and practical manner the arrangements for the Congress and the excursions which are enabling us to appreciate the beauties of Spain.

« I would ask our dear Spanish friends to again accept, in the name of all the delegates, our warmest gratitude.

« Your Excellencies, Ladies and Gentlemen, I propose the toast of the Royal Family. I drink to the greatness and prosperity of Spain. »

The Minister of Public Works, who presided over the banquet, expressed his feelings of the warmest cordiality towards all the countries represented at the Congress and his desire for its complete success.

After the banquet, part of the company present adjourned to the ball room, where dancing was continued until an early hour, while the remainder went to the hall where animated conversations took place.

10 May.

In the afternoon the members of the Congress visited the installations of the Madrid Metropolitan Railway. Refreshments were served in one of the garages.

The room was profusely ornamented with artificial flowers which left the impression of huge baskets of roses and pinks, while garlands of flowers and laurel leaves adorned the walls.

The visitors were received by the Engineers and the technical staff of the Company.

11 May.

The 10 excursions arranged for the delegates by the Local Organising Committee took place on that day. Delegates and their families, comfortably seated in special trains or autocars went out to visit Toledo, Salamanca, Segovia-La-Granja, the Escorial, Avila und Aranjuez. These were all attractive trips and the Municipalities, the Commercial Corporations and the High Authorities of the towns visited, by their kind welcome and their courtesy, did their utmost to make visitors enjoy fully the few hours they were to spend in these places. For all these excursions, the return journey ended at dusk, in Madrid.

13 May.

Same trips as on the 11 May.

14 May.

At 10.30 p. m. the reception offered by H. M. the King at the Royal Palace took place. Guests entered by the Plaza de Armas and the grand staircase where the « Caballerizas » footmen were drawn up.

At 11 p. m. the Royal Family, preceded by the Majordomo's on guard, left their private apartments to meet the guests.

H. M. the King wore the uniform of the Civil Engineers with the Grand Cross of Alfonso XII.

H. M. the Queen was dressed in a gorgeous white gown and wore a diadem and diamond jewels.

She was followed by the Infantas Da. Beatriz and Da. Cristina, Da. Beatriz d'Orléans, Da. Isabel, Countess Zamoyska and her brother in law, the Infantes D. Jaime, D. Alfonso de Bourbon, D. Alfonso d'Orléans and Count Zamoyski. Then followed the Ladies in Waiting, the Spanish Grandees, the Intendents of the Palace and the Gentlemen-at-Arms. The members of the Government were also attending.

The King and Queen halted in the Gasparini room where they greeted the Diplomatic Body waiting there with the Introducer of Ambassadors, after which Their Majesties went through the other rooms where the Members of the Congress were waiting. They spoke to several of them and were interested in the affairs connected with their respective countries. At midnight the reception came to an end, the Royal Family withdrew to their private apartments and the guests went to the buffet installed in the dining room.

15 May.

At 6 p. m. the Delegates went to see the building and the installations of the Telephone Company. In the meeting room of the Board, a demonstration was given, 22 stations being placed in a closed circuit, while conversations took place with various countries.

Visitors then went up to the terraces and were offered refreshments.

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On the 16 and 17 May, two special trains left for Sevilla and one for Barcelona, carrying the major part of the Delegates.

The Sevilla trains stopped for three hours at Cordova, enabling Delegates to visit the principal monuments and buildings of that City. Refreshments were offered in the gardens of the Regina Hotel.

The official stay of the Delegates at Sevilla and at Barcelona lasted from the 17th to the 22nd May and the following festivities took place in their honour.

SEVILLA.

17 May.

Delegates who arrived at Sevilla on the 16th made a trip to Jerez, where they were the guests of Messrs. Domecq and Gonzalez-Byass, and visited their renowned cellars. After lunch they

went to see some famous stables. They were back at Sevilla at 8 p. m.

18 May.

In the morning, the Municipality of Sevilla received all the Delegates in the Town Hall where refreshments were offered. In the afternoon they attended a bull fight and those who did not care for this kind of entertainment were able to see a solemn religious procession which went out in town on that same day.

19 May.

Delegates had the morning to themselves so that they could visit the town and the Ibero-American Exhibition at leisure. In the afternoon an organ concert was given in the cathedral and, in the evening in the Exhibition gardens, a « verbena » (Andalusian fête) was given, in the course of which various dances and regional songs were performed. After this a « buñolada » (supper) was served.

20 May.

Delegates had again the morning to themselves, and in the afternoon they were taken in autocars to the Cortijo del « Cuarto » (bull farm) of Messrs. Miura, where an Andalusian fête (« derribo » [bull training]) was given. This was one of the most agreeable afternoons, the temperature being particularly cool.

The programme of the 19 May (excursion to Jerez) was again carried out for Delegates who arrived at Sevilla on the 17th.

BARCELONA.

18 May.

Delegates visited the town and especially the Monastery and the Royal Palace of Pedralves, which they much admired, the Tibidabo, the Holy Family and the « Gothic Faubourg ». They then went to the Provincial Hall and were warmly welcomed by the President of the Deputation who accompanied them on a detailed visit of the building. After this, they went to the Town Hall where the reception took place in the « Ciento » room, and refreshments were served.

19 May.

Delegates went for a trip to Montserrat where they visited the Santa Cueva and San Juan and listened to a canticle sung at the Monastery by the « Escolania ». In the Refectory of the said Monastery was given the banquet offered by the Provincial Deputation of Barcelona. After the banquet, Delegates went through the Monastery and its library. At dusk they returned to Barcelona.

20 May.

According to the programme drawn up for their stay in Barcelona, Delegates were taken in autocars to the Exhibition. After they had gone over the principal avenues, they stopped at the National Palace. They also visited the Pavilion of the Town and that of the Transportation Section, and at 1 p. m. they attended the banquet offered in the Restaurant of the Exhibition by the Spanish Local Organising Committee.

After lunch, Delegates took themselves to the « Pueblo Español » (Spanish Village), where they witnessed a number of regional dances performed by folkloric elements who happened to be in town in connection with the festivities at the Exhibition. Finally they proceeded to the Meeting Room of the Mayoralty of the « Pueblo Español » where they were invited to a lunch which brought the official festivities in the City of Barcelona to a close.

NOTICE.

We are requested by the Local Organising Committee of the Madrid Congress to inform our readers that a few complete sets of the postage stamps specially issued on the occasion of the Session are still available and can be obtained from « La Asociación Benefica de Correos, Palacio de Comunicaciones, Madrid ».

The complete set including the air post stamps costs 25.03 pesetas, postage included (registered).

For orders of 10 sets and over, the price is 24.33 pesetas per set (postage included).

These stamps are sold to the benefit of the orphans of the Spanish Post und Railway Staff.